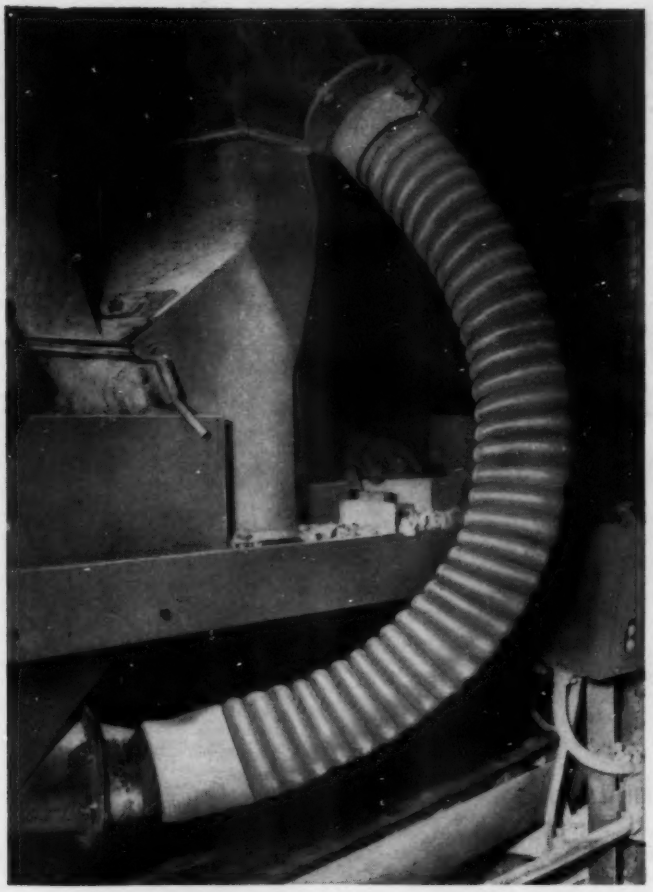
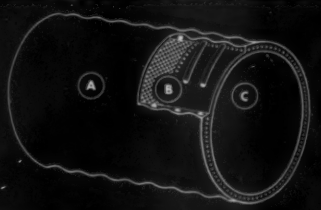


GOODYEAR INDUSTRIAL PRODUCTS

GTM-Specified

HD Industrial Vacuum Hose for conducting abrasive dust or acid fumes



A Tough wear- and weather-resistant cover

B Reinforcement of sturdy wrapped fabric plus helix of flat steel wire prevents kinking and collapsing

C Smooth rubber tube resists attack of abrasive particles or corrosive fumes

Ten times the service

in brick dust collecting

AFTER baking, insulating firebricks are cut to exact shape in special sizing machine. A vacuum system carries off the grit and dust.

Steel pipe was used as the vacuum line. But wherever a slight bend occurred, the extremely abrasive dust quickly wore through. Down time and replacement costs were much too high. The G.T.M.—Goodyear Technical Man—recommended the curved pipe be replaced with Heavy Duty Industrial Vacuum Hose (see blueprint).

Result: The rubber pipe lasted *more than ten times as long*—cut maintenance costs accordingly.

How can hose solve your tough materials handling problems? For the right answers, see the G.T.M., your Goodyear Distributor or write Goodyear, Industrial Products Division, Akron 16, Ohio.

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the Yellow Pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

HD INDUSTRIAL VACUUM HOSE by

GOODYEAR

THE GREATEST NAME IN RUBBER

For more facts circle 502 on Reply Card

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'ROUND ABOUT with the editors in field and office

Edited by R. L. Marinello

Attention: Plant Smoke-Eaters

FOURTEEN DIFFERENT fire training courses, each lasting three days, will be conducted during 1956 on the 10-acre fire test field of Ansul Chemical Co., at Marinette, Wisconsin.

Instructors will teach the latest techniques in fire extinguishment to representatives of industry, government and the municipal fire-fighting services.

Dates for the school will be: May 21 to 23; June 4 to 6, 11 to 13, 18 to 20 and 25 to 27; July 9 to 11, 16 to 18, 23 to 25, July 30 to Aug. 1; August 20 to 22 and 27 to 29; September 17 to 19 and 24 to 26; and October 8 to 10.

Students will be taught to use hand, wheeled and large stationary fire equipment against flammable liquid and propane gas fires of all sizes and types.

There is no tuition fee. As in the past, registration, which is on a first-come, first-served basis, will be limited to 25 men for each class. Additional information may be obtained by writing to the Director, Customer Training School, Ansul Chemical Co., Marinette, Wisconsin.

Course in Nuclear Energy

BASIC INFORMATION on nuclear energy is being offered as a 39-lesson home study course. The course includes fundamental principles in atomic physics, nuclear physics, effects of radiation, reactors and power generation, materials and applications.

Although it has been prepared for home study, the course is also available to company or industrial groups.

Address inquiries to the Institute of Scientific Studies, 248 Arlington, Elmhurst, Illinois.

Paint Peeling Problem

► Can you help this reader? We recently received a letter from R. A. Swanson, Plant Superintendent, Smith Welding Equipment Corp., about the problem he is having with paint peeling from sandstone brick. If you have any helpful suggestions Mr. Swanson would appreciate hearing from you.—*Editors.*

Here's His Problem

"We have a two story building which is constructed of sandstone brick except two exposures which are faced with a red clay brick. The interior of brick walls is painted with gloss enamel. The exterior was painted with an oil base paint in 1940. Since that time, the paint has peeled and the brick has spalled. This sandstone brick is very soft and absorbs moisture very readily.

"I would certainly appreciate answers to the following questions:

"1. Should this type of building have ever been painted? 2. If so, what kind of paint? 3. Should there be a preservative of some sort put on? 4. If so, what kind? 5. Should we remove the old paint that is still on and if so, why?" *R. A. Swanson, Plant Superintendent, Smith Welding Equipment Corp., 2619-33 Fourth Street, Southeast, Minneapolis 14, Minn.*

Motion and Time Study Course

CAN EXISTING methods and procedures in your plant be improved? You may find the answer at the Motion and Time Study Intensive Course, offered by the Department of Industrial Engineering of Washington University, St. Louis, Mo. It will be presented from June 6th through June 15th.

Objectives of the course will be to help prepare the attendee to (1) apply Motion and Time Study in his own organization and (2) train others in his company in the principles of Motion and Time Study.

For further information concerning the course content, instructors and registration, write to the Department of Industrial Engineering, Washington University, St. Louis 5, Missouri.

What's Your Plant Problem?

EVERY DAY, you, as a plant engineer, are confronted with new problems. If you had a difficult and somewhat unusual problem in your plant, recently or in the past, and found a good solution for it, we would certainly like to hear about it.

Send us a brief description of the problem, the solution and a photograph or sketch to illustrate the story. Send this information to the Editor, PLANT ENGINEERING, 110 South Dearborn St., Chicago 3, Illinois. Naturally, we will pay for contributions which we publish.

How to Handle PVC Materials

INFORMATION ON THE handling of unplasticized polyvinyl chloride materials is now available from the Plastic Fabricating Institute, recently established at Lawrence, Massachusetts. H. N. Hartwell & Son, Inc., of Boston, Mass., and Bolta Products, a division of The General Tire & Rubber Co. established the Institute.

Its main purpose is to train fabricators,

Subscriptions: U.S.A. $10, Canada $11. Other countries $12 per year. Single copies $1. Change of Address: Send to PLANT ENGINEERING, Circulation Division, Barrington, Illinois. Please supply position title, company name, company address. Request must reach us by 15th of month to make the change effective with following month's issue. Published monthly and accepted as controlled circulation publication at Chicago, Ill.

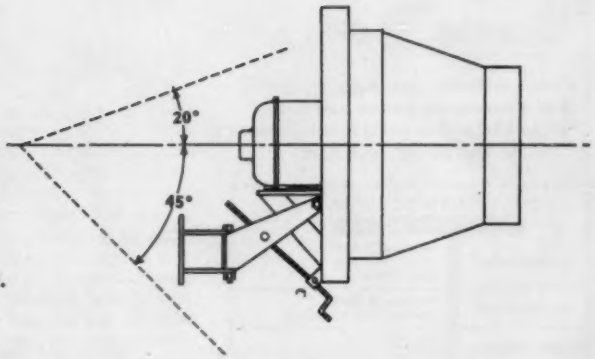
REMEMBER

June not too soon!
July stand by!
August look out!

SOLVE PRODUCTION COOLING PROBLEMS NOW. . .

WITH "Hy-V" AIR JETS

Mount up high off the floor . . . out of the way . . . on walls or columns. Then "Hy-V" Air Jets can't be damaged by trucks . . . cords can't be cut by wheels. These fan units jet a blast of cooling air up to 74 feet without ducts . . . can be depressed 45° and aimed left or right.



Use to cool production men exposed to heat from ovens, furnaces, forges or molten metal. Workmen become less fatigued, require less time out. But, don't wait for hot weather. Investigate now.

Air quench extrusions to improve physical properties. Speeds up production . . . cuts costs. Cools equipment too. Mail coupon today.

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☐ Send bulletin containing complete data on "Hy-V" Air Jets.
☐ Have a DeBothezat representative call.

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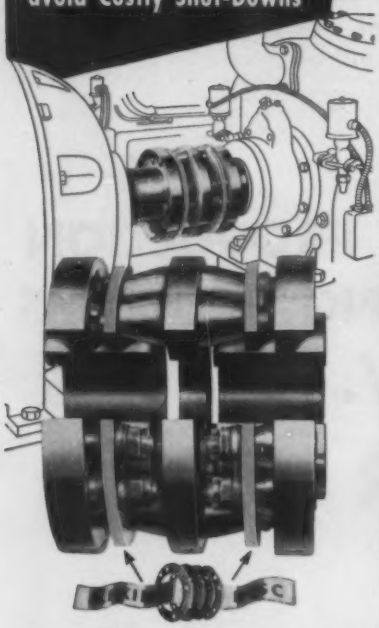
Specify THOMAS ALL METAL FLEXIBLE COUPLINGS

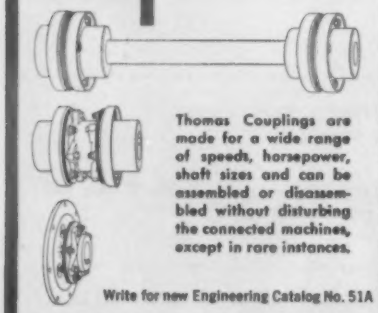
for Power Transmission to avoid Costly Shut-Downs



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower, shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING CO.

WARREN, PENNSYLVANIA, U.S.A.

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'ROUND ABOUT

distributors, piping contractors and industry in the application, fabrication, welding and forming of unplasticized polyvinyl chloride materials. Special sessions are also being conducted on the proper methods and various techniques in the installation of PVC pipe. Another aim of the Institute is to insure the proper and most efficient use of the complete line of Boltaron 6200 and 7200 PVC pipe, fittings, valves and stock.

For further information, write directly to H. N. Hartwell & Son, Inc., Park Square Building, Boston 16, Mass.

Plant Engineer Foster

James B. Foster was recently appointed plant engineer at the Mobile, Alabama, Paperboard Mill Division of Stone Container Corp. He is a graduate of Alabama Polytechnic Institute and was formerly employed by Waterman Steamship Co., U. S. Engineers and Aluminum Company of America.

Wear Study of Metal Parts

"WEAR THEORY in Metal Cutting and Bearing Design" will be the subject of a two-week special summer program offered at the Massachusetts Institute of Technology from June 18 through June 29.

Several types of wear that normally contribute to the gradual deterioration of surfaces will be considered. Also, new development in the theories that have been devised to explain the several types of wear will be discussed.

Among lecture topics will be the structure and properties of solids and lubricants, techniques for use in wear studies, wear studies involving radioactive tracer methods, friction and wear in bearings, temperatures and wear characteristics of cutting tools and grinding wheels and machinability and machining economics.

Full details and application blanks for this Special Summer Program may be obtained from the Summer Session Office, Room 7-103, Massachusetts Institute of Technology, Cambridge 39, Mass.

Full Program Planned for Material Handling Conference

TWELVE MANAGEMENT experts will be speakers at The Material Handling Society Technical Sessions June 5, 6 and 7 at the Cleveland Public Auditorium in Cleveland, Ohio. The technical sessions are being held in conjunction with The Material Handling Institute's Exposition.

The theme of the technical sessions will be "Integrated Handling—Management Profit Tool." Included in the sessions will be meetings on work measurement, cost analysis, automation, work simplification, plant layout, traffic management, distribution and storage.

The Society is also planning its first national dinner at the Cleveland Hotel on June 6, at 6:30 p.m. Dinner speaker will be John R. Bright, Chief Planning Engineer, John Lucas, Ltd., Birmingham, England, and past chairman of the Institute of Material Handling of England.

If you would like an advance registration card for the Exposition, just indicate this on one of the inquiry cards in this issue. Pre-registration for the technical sessions should be made through the American Material Handling Society, Technical Sessions General Committee, Box 6662, Cleveland, Ohio.

New Plant Engineers for Hooker

Robert W. Sherwin has been appointed plant engineer of the Tacoma, Washington, plant of Hooker Electrochemical Co., Niagara Falls, N. Y. Mr. Sherwin graduated from California Institute of Technology in 1943 with a B.S. degree in chemistry; in 1950 he received his M.S. degree in chemistry; and in 1952 a Chemical Engineering degree. He joined the company's Tacoma plant in 1951.

Lawrence P. Hallahan was appointed plant engineer for the Chlorine-Caustic Soda Plant of Hooker Chemicals, Ltd., now under construction at North Vancouver, British Columbia. Mr. Hallahan graduated from Worcester Polytechnic Institute in 1948 with a B.S. degree in Chemical Engineering. He has worked as a chemical engineer with National Aniline Division of Allied Chemical and Dye Corp., and as a chemist with O-Cel-O, Inc. In 1950 he joined Hooker's process study group at Niagara Falls as a chemical engineer and since then has held a number of positions in the company.

What's Ahead in Automation?

HOW MUCH more automated equipment will the plant engineer have to take care of in the next few years? A good indication of what industries will automate and to what extent can be found in the results of a survey conducted by the American Society of Tool Engineers.

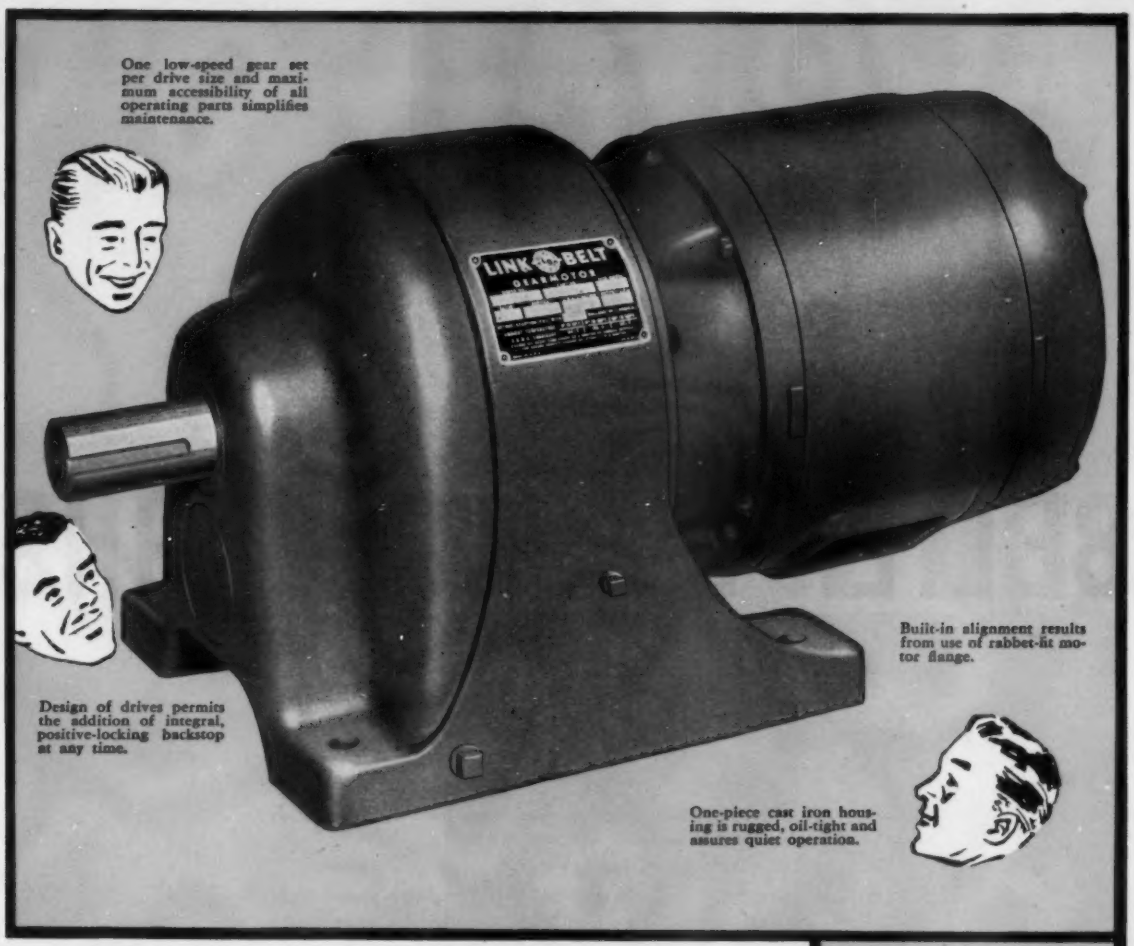
In the automotive industry, it is estimated that 35 per cent of the equipment purchased in the next two years will be automated.

The fabricated metal products industry, by virtue of its size, represents possibly the largest market for automated production equipment. In 1956, automation will be specified on 20 per cent of all new equipment orders. For 1956-57, the total will be around 25 per cent of equipment orders.

In electrical equipment and the electric appliance industry, about 14 per cent of 1956 purchases of production equipment will specify automation. In 1957, the total will go up sufficiently to make the two-year average about 18 per cent.

In the heating, ventilating, air conditioning and refrigeration industries, it is estimated that about 10 per cent of new equipment purchases will specify automation in 1956. Total for the two years, 1956-1957, is estimated at 15 per cent.

NEW! COMPACT! RUGGED!


One low-speed gear set per drive size and maximum accessibility of all operating parts simplifies maintenance.
LINK-BELT
GEARMOTOR
Built-in alignment results from use of rabbet-fit motor flange.
Design of drives permits the addition of integral, positive-locking backstop at any time.
One-piece cast iron housing is rugged, oil-tight and assures quiet operation.

LINK-BELT GEARMOTORS

maintain positive alignment with flange-mounted NEMA motors . . .

Dependable alignment, long-lasting efficiency and quiet, oil-tight operation — every quality that constitutes top drive performance is built into modern Link-Belt Gearmotors. New design concepts with improved construction and latest manufacturing methods provide maximum economy, minimum maintenance in heavy-duty service.

Choose a Link-Belt Gearmotor up to 30hp, speeds from 280 down to 6 rpm. Contact your nearest Link-Belt office or authorized stock-carrying distributor today.

Ask for new 28-page Book 2447—offering interesting design highlights and complete engineering data.

Link-Belt has also developed a new line of Motogears for bracket-mounting NEMA foot-type motors of any manufacture, with such outstanding features as quick motor replacement, straddle-mounted pinion and other advantages essential to continuous service under shock, reversing and heavy loads.

LINK-BELT

ENCLOSED DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,500

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FREIGHT ELEVATORS for loads ranging from 40,000 pounds down to 1,500 pounds.

Booklet B-705 describes Otis Heavy Duty Freight Elevators.

Booklet B-720 describes Otis Self-Supporting Light Duty Freight Elevators.

Booklet A-414 describes Otis Plunger Electric Freight Elevators.

Booklet A-382 describes all Otis Vertical Transportation equipment and services.

ELECTRIC DUMBWAITERS for loads up to 500 pounds at speeds of 50 to 300 f.p.m.

Booklet A-411 describes Otis Traction Type Dumbwaiters for all-purpose use in multi-story buildings of any height; Otis Drum Type Dumbwaiters for 30'-6" maximum rise; and Otis Undercounter Dumbwaiters for stores and restaurants.

We'll be glad to send you any or all of the above booklets.

Otis

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freight elevators

LIGHT, GENERAL, AND HEAVY DUTY

ELECTRIC DUMBWAITERS

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installation
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small

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OFFICES IN 294 CITIES ACROSS THE UNITED STATES AND CANADA

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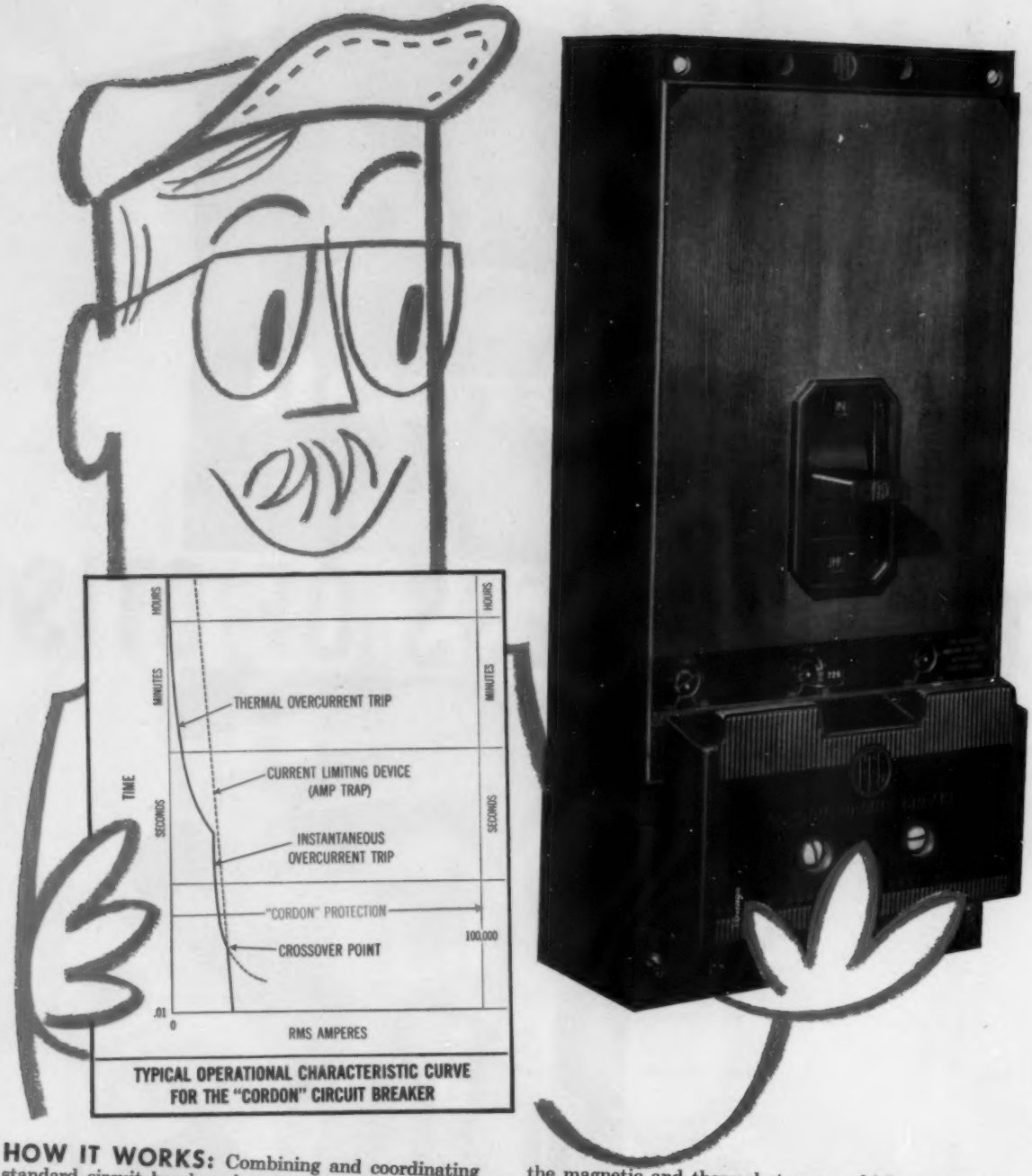


TYPICAL OPERATIONAL CHARACTERISTIC CURVE FOR THE "CORDON" CIRCUIT BREAKER

HOW IT WORKS: Combining and coordinating standard circuit breaker characteristics with specially designed current limiting Amp-traps, the "Cordon" circuit breaker achieves the characteristics shown above.

The thermal-magnetic overcurrent devices provide coordinated protection against overloads and short circuits up to a predetermined value (crossover point). At this point the current limiting Amp-traps assume the fault-clearing duty and extend short circuit protection to 100,000 rms amperes.

Unless the magnitude of a short circuit reaches the crossover point, the Amp-traps are unaffected, and the standard circuit breaker overcurrent devices perform their normal function. Since the fast clearing time of the Amp-trap (less than ½ cycle) provides current limiting, the magnetic and thermal stresses, which are proportional to the square of the current, are greatly reduced. Consequently, the standard molded case type circuit breaker safely withstands the heavy fault current. It is unnecessary to design bus-supporting members or current-carrying parts to meet the maximum peak current.

The Amp-traps are mounted in a molded housing which plugs into the load side of the breaker, forming one compact unit. A design feature of the "Cordon" circuit breaker actuates a common tripper bar when any Amp-trap blows, opening all poles of the circuit breaker. Until the blown Amp-trap is replaced the circuit breaker cannot be closed. A mechanical linkage arrangement automatically opens the circuit breaker before the Amp-trap housing is removed.

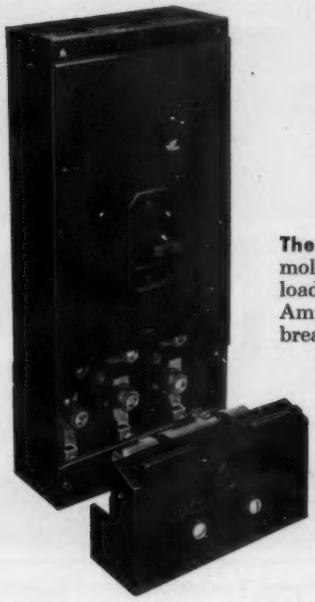
New I-T-E "CORDON" Circuit Breaker

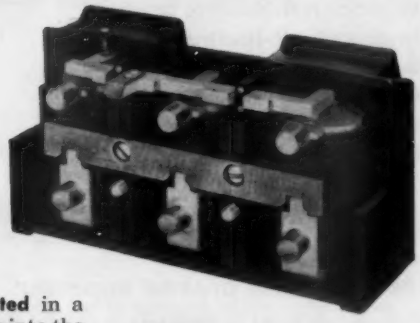
100,000 amp interrupting rating in molded case circuit breakers

Now—one compact circuit breaker provides the practical, economical solution to meet constantly increasing interrupting requirements. The new "Cordon" circuit breaker provides all of the design and operating advantages of the famed I-T-E molded case breaker, plus interrupting ability up to 100,000 rms amperes.

The "Cordon" circuit breaker can be utilized in normal branch and feeder circuit applications in switchboards, panelboards, load centers, and individual enclosures. Plug-in mounting, rear connected studs, or front connected terminal mounting arrangements are optional.

"Cordon" circuit breakers are available with 2 or 3-pole construction in 100, 225, 400 and 600 ampere frame sizes, 250 v d-c and 600 v a-c. Write for complete details or call your nearest I-T-E office. I-T-E Circuit Breaker Company, Small Air Circuit Breaker Division, 19th & Hamilton Sts., Phila. 30, Pa.





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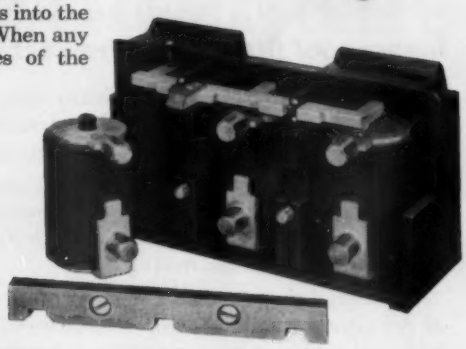

Draw-out design feature of Amp-trap housing provides accessibility to simplify change of Amp-trap. Amp-trap stud design assures proper alignment and positive connection when inserted in the breaker frame.

To replace a blown Amp-trap (indicated by released plunger), simply loosen two screws, remove the retaining bar, withdraw the blown unit, insert the new one, and replace the retaining bar.

I-T-E CIRCUIT BREAKER COMPANY

Small Air Circuit Breaker Division

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Now—for maximum Roof Protection Johns-Manville

Aquadam

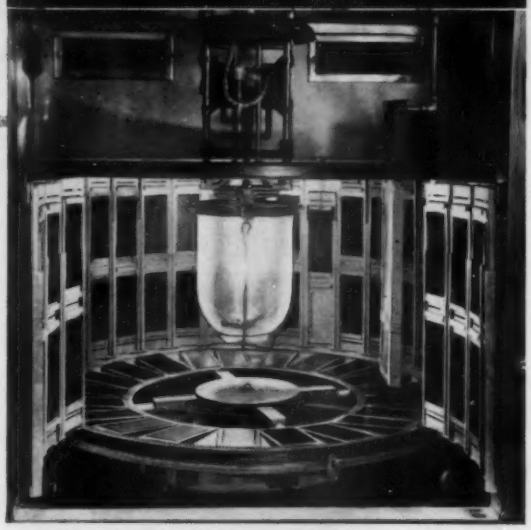
(slag or smooth surfaced)

Built-Up Roofs*

Aquadam offers these important advantages:

- Superior weather resistance
- Superior resistance to cracking
- Improved self-healing properties
- Greater kettle stability
- Greater adhesion—stronger bond
- Greater resistance to water
- Excellent uniformity

Tests prove Aquadam's superior weather resistance!



J-M's Accelerated Weathering Test subjected samples of dead level bitumens to repeated radiation, water spray and refrigeration. Results: Aquadam has approximately twice the ability of typical asphalts to retain its initial properties on exposure.

J-M Aquadam proved superior by actual test... helps provide longer roof life at no extra cost

Johns-Manville Aquadam is specifically designed to provide maximum built-up roof service for deck inclines from dead level to ½″ per foot*.

J-M Aquadam Built-Up Roofs owe their proven superiority to the newly developed bituminous asphalt cementing agent Aquadam—which is used in the application of the roofing felts.

When applied, the excellent adhesive properties of Aquadam provide a permanent bond to the felts, and to gravel or slag surfacing. Its rigidly controlled quality and excellent flow properties assure easier mopping, thorough coverage, and longer lasting roof life.

For complete information about Aquadam Roofs, see your Approved Johns-Manville Built-Up Roofing Contractor. He's listed in the classified section of the telephone directory. Or write Johns-Manville, Box 158, New York 16, N. Y. In Canada, write 565 Lakeshore Rd. East, Port Credit, Ont.

Fight cancer with a checkup and a check—give to American Cancer Society

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

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Nicholson *steam trap* simplicity *gives you*

peak performance, low-cost maintenance

Write, today, for your copy of new Bulletin 10-55—for detailed information.

Nicholson simplicity of design and operation pays off big in any plant . . . in peak performance of steam using equipment . . . in easy, low-cost maintenance. Nicholson traps offer the most effective method for discharging condensate and air from steam lines.

- **one moving part—big husky bellows.**
- **positive shut-off—no waste of steam.**
- **high capacity—effective use of large orifice.**
- **each unit service tested—with steam.**

When less than the best won't do, specify Nicholson.

NICHOLSON

W. H. NICHOLSON and Company

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NEW FORK TRUCK DEVELOPMENT

Yale

Yale "integrated design"

Result of a 3-Year Research and Development Program

Yale combined 3 years of intensive research, development and field-testing to meet the urgent need of every industry for a complete line of gas, diesel, LP-gas and electric fork lift trucks which would assure increased safety, speed and efficiency. The result is Yale "Integrated Design"—the incorporation of the latest engineering and design advances as *standard features* in a complete new line of fork trucks that not only give management positive control over handling costs through high efficiency operation, but also reduce operator fatigue and promote operator safety.

LATEST YALE FIRST!

New Yale KG51 series gas trucks are the only industrial lift trucks which are GS approved by Underwriters' Laboratories. These Yale trucks satisfy all the requirements of the National Fire Protective Association for safe use where combustible fibers or containers of hazardous liquids or gases are being handled in storage. All new Yale gas trucks have Factory Mutual and Underwriters' Laboratories G approval.

"integrated design"

. . . now makes available a complete new line of fork lift trucks incorporating—for the first time in the industry —premium engineering advances as standard features.

Yale "Integrated Design" offers a complete choice of fork trucks, engineered to eliminate all handling-cost waste by meeting each industry's specific requirements for power, capacity, efficiency, safety, versatility and operator comfort. All the critical features necessary for maximum performance and minimum handling costs are built in as *standard features* throughout the entire Yale fork truck capacity range of 2,000 to 10,000 pounds!

New fully-automatic Yale Torque Transmission provides an infinite ratio of speeds and an automatic response for every power demand in starting or climbing grades under all load conditions. Coordinated inching control permits smooth, accurate maneuvering when high engine speeds are required for fast lifting. Forward or reverse travel motion is obtained by the mere flick of a switch located on the steering column. Standard Transmission and Fluid Coupling are also available in all capacities.

Self-adjusting hydraulic wheel brakes. An original Yale development (now, like many other Yale firsts, adopted by the industry), these brakes, of increased capacity in the new Yale truck line, are mounted directly to each drive wheel for easier, faster stopping without jolting or load damage.

New Yale power lift is faster, smoother. Along with increased travel speeds, all new Yale truck models feature an improved roller channel construction that prevents hose damage and increases visibility. Side-thrust rollers reduce stress and compensate for off-center loading. Incorporated are other Yale-pioneered features: the anti-cavitation or unloading valve that eliminates channel sway; the flow-regulator valve that assures smooth lowering control without excessive speed.

New Yale "convenience styling." New Yale trucks are lower-built, more streamlined. Lowered cowls, "open vision" uprights and recessed, adjustable seats add to the visibility and protection of the operator. Yale "convenience styling" increases operator efficiency with controls for hoisting, lowering, tilting of channels and operation of attachments positioned for easy, right-hand operation—leaving the left hand free for steering. Instruments are waterproofed and recessed for protection in the lowered cowl, where they are centrally grouped for easy reading. Yale's fuel tank holds sufficient fuel for a full shift's operation, is easily removable and heavily protected within steel sections. The "swing out" battery permits quick servicing and engine accessibility. The Yale-developed one-piece steel drive axle housing with pressed-in steel alloy sleeve assures longer life.

1956 Yale electric trucks incorporate many of the above construction features with such Yale electric truck features as multiple-speed design (four forward, four reverse) based on Yale's exclusive, patented, Magnetic Cam-O-Tactor controller providing smooth acceleration without "jumping" a speed range, and the dead-man control built into the seat to set mechanical wheel brakes when the operator leaves the truck.

First public showing of new Yale line. See new Yale trucks in action at the Materials Handling Institute Exposition in Cleveland, June 5 to 8. Assess for yourself the industry's most significant advances in industrial lift truck design. For more information now on the new Yale line, write: The Yale & Towne Manufacturing Company, Philadelphia 15, Pa., Dept. 475.

YALE*

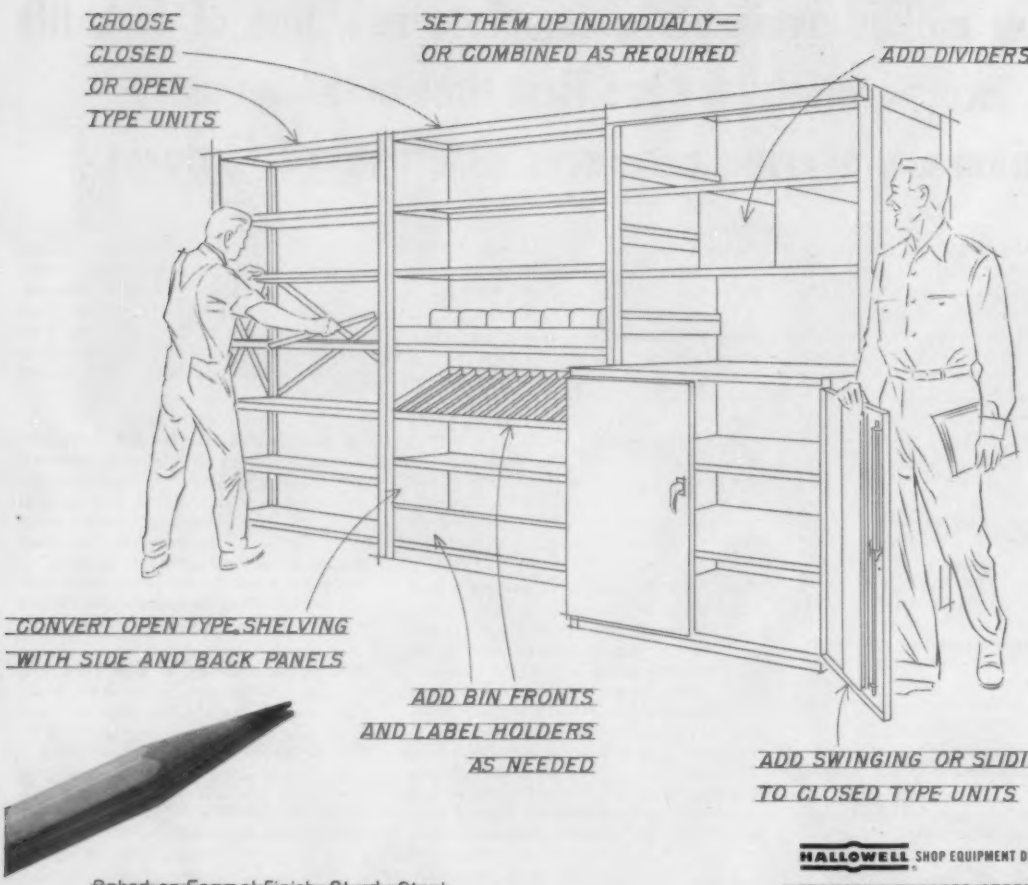
*REG. U. S. PAT. OFF.

INDUSTRIAL LIFT TRUCKS AND HOISTS

Gas, Electric, Diesel & LP-Gas Industrial Lift Trucks • Worksavers • Warehousers • Hand Trucks • Hand and Electric Hoists

For more facts circle 510 on Reply Card

HOW TO USE HALLOWELL ADJUSTABLE SHELVING IN PLANT MODERNIZATION


CHOOSE CLOSED OR OPEN TYPE UNITS
SET THEM UP INDIVIDUALLY— OR COMBINED AS REQUIRED
ADD DIVIDERS
CONVERT OPEN TYPE SHELVING WITH SIDE AND BACK PANELS
ADD BIN FRONTS AND LABEL HOLDERS AS NEEDED
ADD SWINGING OR SLIDING DOORS TO CLOSED TYPE UNITS

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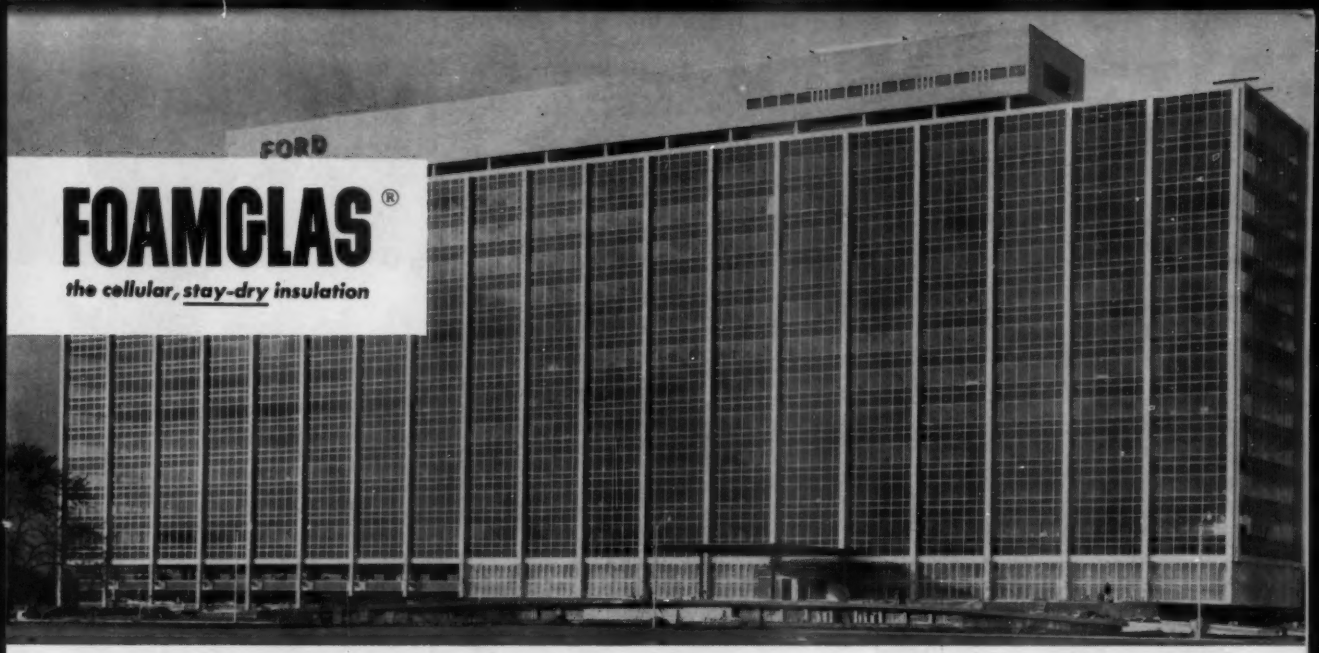
For more facts circle 511 on Reply Card



FOAMGLAS®

the cellular, stay-dry insulation

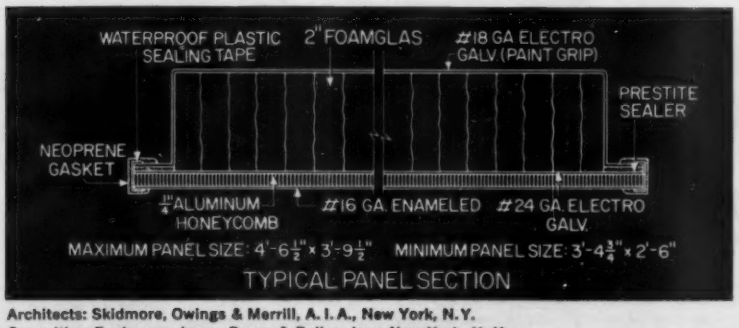
FOAMGLAS-porcelain panels give FORD durable curtain walls with constant U-value

As up-to-the-minute as the Ford family of fine cars . . . the Ford Motor Company's new $30,000,000 Central Staff Office Building at Dearborn, Michigan, demonstrates the functional simplicity of design possible with curtain wall construction. An integral feature of the 6,616 prefabricated porcelain enamel curtain-wall panels is the 2" insulating core of FOAMGLAS to provide vital structural and thermal benefits.

Since FOAMGLAS is impervious to moisture, insulating value remains unchanged under all weather conditions. Ford can count on a constant U-factor of 0.15 for the finished panels. What's more, FOAMGLAS is completely inorganic, dimensionally stable and will not deteriorate in service. It's fireproof, too, for extra building safety.

With a compressive strength of over 7 tons per sq. ft., FOAMGLAS withstood all laminating pressures required to make each panel a sound structural unit. Its light yet rigid structure helped strengthen the finished units while weight was held to just 7½ lbs. per sq. ft.

Each panel unit was inserted in a preformed rabbet in the building's aluminum grid frame. An aluminum stop moulding was then screwed into the frame and topped with a cover moulding. Panels were installed at the rate of 4 per hour for a final erected cost of only $4.25 per sq. ft.



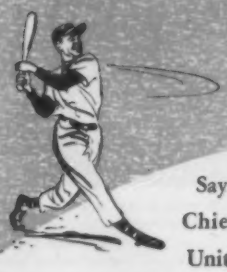
Architects: Skidmore, Owings & Merrill, A. I. A., New York, N.Y.
Consulting Engineers: Jaros, Baum & Bolles, Inc., New York, N. Y.
General Contractor: Bryant & Detwiler Co., Detroit, Mich.
Panel Manufacturer: Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

Ford also took full advantage of the outstanding insulating performance of FOAMGLAS by using it to insulate all roof areas and exterior columns in the new building. Whatever your own insulating problems, it will pay you to send today for detailed literature on the use of cellular, stay-dry FOAMGLAS . . . the strong inorganic insulation for panels, roofs, ceilings, walls, floors, piping or equipment. Write us, specifying your insulating problems. Address:

Pittsburgh Corning Corporation
Department PE-56, One Gateway Center
Pittsburgh 22, Pennsylvania
In Canada: 57 Bloor St. W., Toronto, Ontario

For more facts circle 512 on Reply Card

"You can't get a Better Boiler Box Score"



Says Stanley D. Loomis, Chief Engineer of The United Piece Dye Works, a leader in the field of textile dyeing, finishing and printing. Of course, he's referring to the C-E Package Boiler, Type VP—installed in the newest and most modern United Piece Dye Mill at Charleston, South Carolina. His box score for 1955 appears at the right.

SCORE CARD

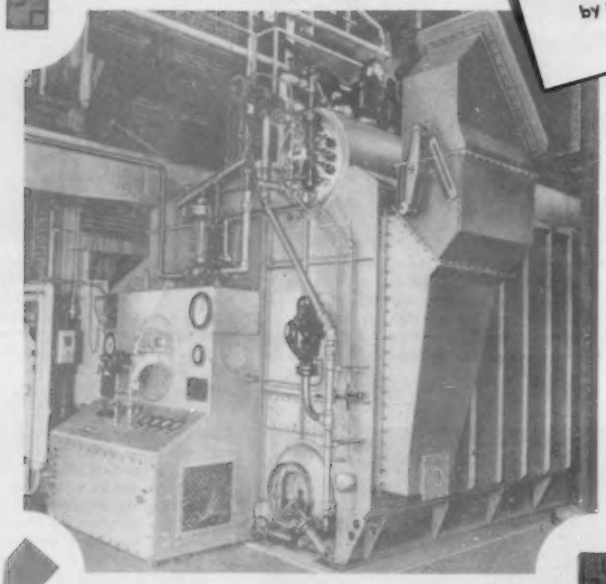
AT BAT 3 shifts a day, 6 days a week without a single unscheduled outage.

RUNS around the clock with a quick response to load change and an ability to sustain a high overload capacity while producing high quality steam.

HITS the performance mark. C-E's prompt service and complete cooperation matches the quality of the boiler.

PUT OUTS of maintenance and repair bills are assured by the boiler's conservative design and built-in advantages. To date there have been no repair bills at all.

ASSISTS in the continued full-production operation of the plant by meeting every steam need unfailingly.



Need a Package Boiler? See C-E! You can't get a better boiler box score.

B-911A

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Combustion Engineering Building — 200 Madison Avenue, New York 16, N. Y.

CANADA: COMBUSTION ENGINEERING-SUPERHEATER LTD.

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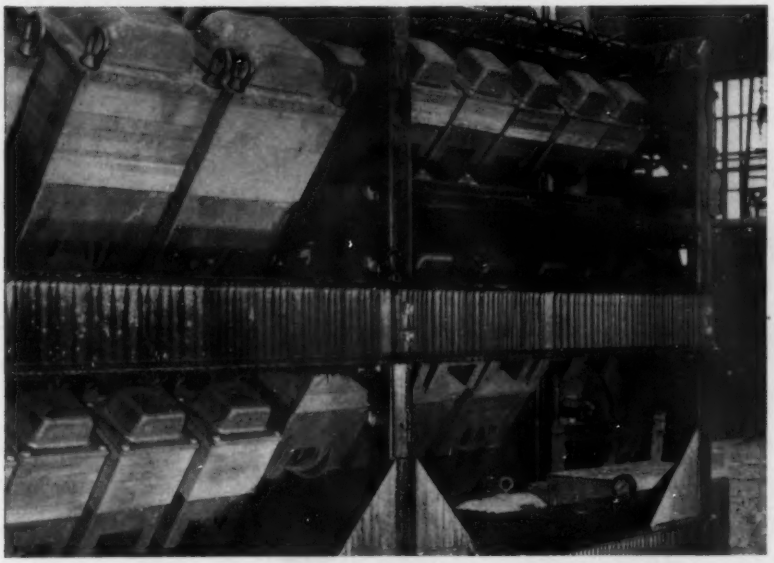
C-E

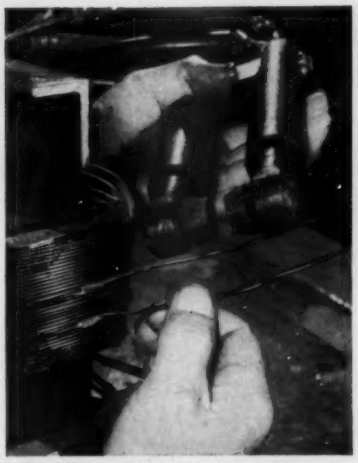
For more facts circle 513 on Reply Card

Dry-Type Transformer | NEWS

New Line of G-E Voltage Stabilizing Transformers



Standard design will stabilize a 30% voltage change to 1% nominal within 1½ cycles



G-E voltage stabilizing transformers are tested to find the proper turn ratio on the secondary coil. A tap lead is then brazed to this turn to give positive ±1% turn ratio.

NEW VACUUM IMPREGNATION PROCESS GIVES G-E DRY-TYPE TRANSFORMERS LONGER LIFE

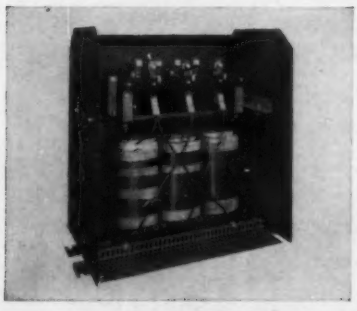
G-E dry-type transformers now give even longer life because the entire core and coil assembly is thoroughly impregnated by an automatically controlled vacuum-pressure process which removes all moisture, gives higher insulation strength and combats corrosive atmospheres. Varnish insulation penetrates the entire unit, and not merely the exposed surfaces. These units available in all standard ratings.

With G-E voltage stabilizing transformers in the circuit, control voltage can be held high enough to prevent relays and solenoids from dropping out under adverse line disturbances. Lightning is a typical example of a disturbance which occurs in most parts of the country. As the lightning charge bleeds off the line through arresters, the line voltage may drop to as low as 30% of normal for a period of approximately 2 to 20 cycles. Properly applied, G-E voltage stabilizing transformers will hold the voltage level up sufficiently to keep the relays locked-in.

G-E voltage stabilizing transformers are available in standard ratings from 15 to 10,000 volt-amperes.

For further information write General Electric Company, Section 410-23, Schenectady 5, New York. Ask for Bulletin GEA-5754.

NEW TYPE D TRANSFORMERS EASY TO CONNECT, SIMPLE TO MAINTAIN



Both the top and sides of the new square case design are easily removed to simplify installation and maintenance. Connections are easily made to solderless connectors in the large, roomy wiring compartment. Thus, as plant power requirements change, G-E Type D transformers can be readily moved to new locations. See your distributor, he has most popular ratings in stock.

GENERAL ELECTRIC

For more facts circle 514 on Reply Card

NEW Black & Decker® Heavy-Duty Jig Saw is—

POWER-BUILT

FOR YOUR TOUGHEST JOBS!

We don't buy motors—we build them!

The *heart* of your electric tool is the motor —completely built by Black & Decker! All the power you need and then some—because each motor is built for a specific tool and the job it must do. Black & Decker motors always *stand up!*

Cuts any angle up to 45°...on either side!

Rugged, versatile, highly accurate—cuts intricate patterns with precision!

Runs cool, offers smooth performance in wood—even 2x4's—and metal. Perfect balance reduces operator fatigue. Offers a full 1" stroke. Heavy-duty shoe will not wobble or distort under pressure. Armature and gear shafts mounted on ball bearings. Full line of wood and metal cutting blades available. This B&D Heavy-Duty Jig Saw is priced lower than any comparable tool of similar capacity, in its field.

Call your B&D distributor or write to: THE BLACK & DECKER MFG. CO., Dept. 1505, Towson 4, Maryland.

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Black & Decker®

PORTABLE ELECTRIC TOOLS

For more facts circle 515 on Reply Card

BULLETINS just released and of immediate plant interest

On pages 207-208 are two postage-free Reader Service Cards provided for your convenience in ordering these bulletins. You may also use the cards to order any literature mentioned in ads.

ELECTRICAL

101 Motor Control Center—Described in 24-pp Bulletin GEA-6367 is a compactly designed general-purpose motor control center permitting savings up to 50 per cent in floor area. It is designed to accommodate starter units of either the fusible or circuit-breaker type in NEMA Sizes 1 through 5. Bulletin lists ratings, weights, dimensions, installation data and guide form specifications. Nine major features of the control center are illustrated and explained in detail. General Electric Co.

102 Outdoor Motors—Construction features of weather-protected motors for outdoor installation are described in Bulletin 05B7874B. It is noted that while such motors are available in all commonly used ratings 250 hp and above, the features described in this bulletin apply to the larger machines. A cross section diagram shows mechanical details of a typical 700-hp, 2300-v, 1185-rpm squirrel-cage induction motor. Allis-Chalmers Mfg. Co.

103 Control, Transfer Switches—Bulletin GEA-4746B covers control and transfer switches for low voltage applications up to 600 v, a-c or d-c. Includes photos, drawings, cutaways and discussion of special features. Switches with water-tight and explosion-proof housings are described. Bulletin also contains application data, representative contact diagrams and ordering tips. General Electric Co.

104 Vertical Pump Motors—Containing full-colored illustrations and technical drawings depicting features and applications of vertical turbine pump motors, Bulletin 1903, 16-pp, describes hollow shaft Verticlosed grease- and oil-lubricated motors in sizes from 1½ to 400 hp. Also covers single phase designs up to 7½ hp, and totally-enclosed types up to 150 hp. Graphs showing relation of thrust bearing life to contact angle, starting characteristics of part-winding increment start motors are included. U. S. Electrical Motors Inc.

105 Fuse Cutouts—Catalog CB 56, 16-pp, describes oil fuse cutouts in three voltage ratings and with interchangeable entrance fittings for lead covered or neoprene jacketed cables. Includes oil fuse cutouts dimensions and data on short circuit interrupting ratings and system application. G & W Electric Specialty Co.

106 Current-Limiting Busway—Bulletin GEA-6469, 8-pp, describes the Type CL electric busway having reactance values eight to 23 times those of conventional feeder busways. Discusses construction and application, and lists ratings, weights, dimensions, installation data, specifications. General Electric Co.

107 Plug-In Busway—Twenty-pp Bulletin GEA-6470 describes the factory-assembled Flex-A-Power plug-in busway system permitting direct connection to bus bars for feeding lighting and power loads in industrial plants and public buildings. Describes in detail the construction and application of this busway system. Also lists ratings, weights, dimensions, installation data and guide form specifications. General Electric Co.

108 On Instrument Transformers—Now available is the 80-pp 1956 edition of this company's Instrument Transformer Buyer's Guide. Gives vital facts and figures on a complete instrument transformer line, including recent additions to the group of butyl-molded current transformers. Covers potential transformers, current transformers, metering outfits, portable transformers, Thyrite protectors. Fully illustrated, book includes prices. General Electric Co.

109 Tape Selection Guide—This 12-pp booklet—Form 74-10-50—is designed as a guide to the selection of the electrical tapes best suited for every insulating and protecting application in electrical construction, maintenance and manufacturing. Contains illustrations, technical data, characteristics and performance specifications for plastic, rubber, and vinyl and color tapes. Dutch Brand Div., Johns-Manville.

110 Electrical Tapes—Bulletin P6-1 describing company's newly packaged line of electrical tapes lists each tape by its composition and function. Features four types—a polyethylene, vinyl, plastic coated and cloth tape—and gives advantages of each of these types. Polyken Sales Div., The Kendall Co.

PUMPS, COMPRESSORS

112 Controlled Volume Pumping—Technical Paper 65, 8-pp, covers factors governing accuracy in controlled volume pumping. Test procedures and results of investigations into metering accuracy are recorded. Explains how controlled volume pumps are used as flow control instruments in both open and closed loop instrumentation systems. Typical systems are illustrated. Milton Roy Co.

113 Centrifugal Pumps—Bulletin 4011-A, 12-pp, describes company's complete line of redesigned and resized end suction centrifugal pumps designed to handle different liquids. Performance tables and curves list characteristics of all possible combinations. Photos, cutaway views, dimensional drawings included. The Deming Co.

114 Sump Pumps—Bulletin 103 DS describes company's packaged type DSA sump pumps with capacities to 170 gpm and heads to 70 ft. Includes cutaway drawings, performance curves, specifications and typical dimensions. Aurora Pump Div., The New York Air Brake Co.

115 Hand Pumps—Double action, piston-type hand pumps of 20-gpm capacity are described and illustrated in Bulletin 3011. Design and construction details are provided and applications suggested. Also provided are specifications and data on fittings. Bowser, Inc.

116 Boiler-Feed Pumps—Information on boiler-feed pumps for two-stage centrifugal types is covered in illustrated Bulletin W-318-B23P. Major features of types UNB and UB-12 with capacities to 2500 gpm and heads to 900 ft are described, along with information on elastic seal rings, casing, impellers and casing rings, shaft, shaft sleeves, and stuffing box. Dimension drawings and reference chart on suction and discharge diameters, and flange dimensions are included. Worthington Corp.

117 Turbine-Type Pumps—Eight-pp Bulletin 111 describes company's master turbine-type pumps, with assembled and exploded views illustrating important design features. Shows cross sections of single and two stage pumps and features construction specifications for pump parts requiring corrosion alloys for special liquid handling purposes. Aurora Pump Div., The New York Air Brake Co.

118 Pumps, Valves—Technical data on company's line of centrifugal pumps and valves is provided in 20-pp Bulletin 1055. Includes descriptive information with photos, dimensional drawings, data tables and performance curves of the pumps. Also included are descriptions of the various valves—gate valves, check and butterfly valves—manufactured. Valves listed are constructed to resist abrasive action of solids in waters. McNally Pittsburg Mfg. Corp.

119 Portable Compressors—Form 2313 features the Gyro-Flo 900 rotary portable compressor, which delivers 900 cfm of air yet retains lightweight, compactness of company's line of compressors. Photos, schematic drawing illustrating component parts and specifications are included. Ingersoll-Rand Co.

MECHANICAL POWER TRANSMISSION

120 Report on Fan Clutches—This technical report, about 10 pp, analyzes engineering features and operating advantages of custom-engineered fan clutches available for internal combustion engines. Lists advantages gained through application of a fan clutch to an engine. Fan clutch operation and methods of control are described in detail, with mounting types listed. Warner Electric Brake & Clutch Co.

121 D-C Magnetic Brake—Booklet B-6548 describes a self-adjusting d-c magnetic brake, suitable for all types of d-c motors. Containing many illustrations, booklet covers in detail the construction, operation, and applications of this brake, which, with rectifiers, can be applied to a-c motors. Westinghouse Electric Corp.

122 Improved Sprockets—Brochure 1-56 describes and illustrates manganese-steel sprockets and points out advantages of using Tisco sprockets with removable tooth segments. Stresses longer service afforded by these sprockets. Also illustrates drag conveyor and combination chains for use in cement, paper, quarrying industries. Taylor Wharton Div., Harrisburg Steel Corp.

123 Roller Bearings—Greater load capacity and simplified application, resulting in overall economy, are two features of company's self-aligning roller bearings described in 8-pp Book 2658. Covers adjustable single-row self-aligning roller bearings; adjustable double-row bearings; and pre-adjusted double-row self-aligning bearings. Also gives engineering selection information, dimensional specifications and recommended fitting practices. Link-Belt Co.

MATERIALS HANDLING

124 Electrical Trucks—This 16-pp illustrated catalog features company's electrically-driven industrial trucks that range in size and load capacity from the compact operator-led Transporters to giant Skylift fork and ram trucks capable of lifting up to 100,000 lb. Among equipment illustrated are platform and pallet trucks, both operator-led and rider types, tractors, cranes and special trucks of various kinds. Besides complete specifications, catalog gives aisle width and turning radius required by each type. Automatic Transportation Co.

125 Industrial Trucks—Sixteen-pp Form 3547—the winter issue of company's publication, "The Lever,"—features narrow aisle trucks, walkie trucks, dragline installations, and coil lifters. Fully illustrated, bulletin includes photos of typical applications as well as full specifications. Lewis-Shepard Products, Inc.

126 Heavy-Duty Cranes—Bulletin 88, 6-pp, tells of the efficiencies made possible in receiving, storing and manufacturing of heavy-gage steel automotive frames, through use of overhead traveling cranes. Application photos show unloading and stacking of steel plates and moving of heavy bundles in one plant through various fabricating departments. Whiting Corp.

127 Wire Rope Assemblies—Bulletin TL 500, 24-pp, on company's Tru-Loc fittings and wire rope assemblies, contains data on construction features, applications, breaking strengths. Shows many and varied combinations of standard fittings and assemblies for use as anchor cables, conveyor cables, coal loading assemblies, coupler cables, foot pedal controls, hoist cables, lug assemblies, transmission hoists, and others. Data on special wire hope assemblies are included. Among fittings shown are yokes, sleeves, buttons, eyes, hooks, balls. American Chain & Cable Co., Inc.

128 Air Conveyors—Reprint GDM-35 describes a completely automatic bulk handling system in which dry ingredients are unloaded and transported by air pressure. Lists materials which can be handled with the pneumatic conveyor; includes photos of installations. Fuller Co.

129 For Belt Conveyors—Sixteen-pp Bulletin 355 features conveyor carriers and return rollers for general service on all types of belt conveyor installations. Covers ball bearing carriers, simplex carriers, deep-trough carriers, rubber-roll impact carriers, automatic belt-training carriers, guide rollers and belt conveyor trippers. Includes application photos, drawings, tables of dimensions and other specifications. Stephens-Adamson Mfg. Co.

BULLETINS

(Begins on page 19)

130 **For Bulk Handling**—Bulletin 955, 34-pp, describes equipment for handling bulk material such as rock, gravel and coal. Includes information on conveyors, chain, feeders, elevators, hoppers and drives. Photos, dimensional drawings, data tables and specifications are included. McNally Pittsburg Mfg. Corp.

VALVES, PIPING, FITTINGS

131 **Regulating Valves**—Bulletin 1027 describes basic control regulating valves which feature greater versatility and wider application. A complete description of the valves is given, including specifications for each and information on pressure reducing and desuperheating stations along with package controls. Copes-Vulcan Div., Blaw-Knox Co.

132 **Solenoid Valves**—Catalog 200 describes the complete line of electrically operated two-way solenoid valves for air, gas, steam and liquid flow control. Lists available dimensions, specifications, pressures and applications and contains numerous coil and flow charts. Among valves listed are general purpose, pilot operated bronze valves for ¼ to 3-in. pipe sizes and all stainless steel valves for ¼ to 1½-in. pipe sizes, with pressures ranging from 1 to 1500 psi. Atkomatic Valve Co., Inc.

133 **Gate Valves**—Bulletin 561 describes gate valves for water works distribution systems. Cross sections and cutaway views illustrate construction and operation; dimensions are tabulated. Valves featured conform to American Water Works Association specifications. While these specifications cover only bell end and flanged end non-rising stem gate valves in 3- to 48-in. sizes, this bulletin also includes outside-screw-and-yoke valves conforming to such specifications, and applicable to design, working pressures. Kennedy Valve Mfg. Co.

134 **PVC Valve, Fittings**—Six-pp Circular 601 describes the Luncor valve and fittings. Illustrates construction of this all-molded corrosion-resistant PVC valve; lists more than 250 reagents it resists. Also discusses advantages of the valve and includes installation data and dimensions. Lunkenheimer Co.

135 **Mine Service Pipe**—This 12-pp, illustrated brochure which suggests a range of uses for this asbestos cement pipe, describes how it is made, and gives case histories of various installations. Special emphasis is placed on the Ring-Tite coupling, with illustrations showing its economical assembly. Johns-Manville.

136 **Data on Fittings**—This 12-pp handy pocket catalog contains basic information on forged steel screw-end and socket-welding fittings, forged stainless and alloy steel fittings, 150-lb stainless fittings, unions and special fittings, also hydraulic pumps and jacks. Sizes, ranges, types, materials of construction and design features are included. W-S Fittings Div., H. K. Porter Co., Inc.

137 **Pipe Nipples**—Catalog 755, 16 pp, carries information about pipe nipples, with list prices, carton quantities, weights and ASTM specifications. Pipe nipple, industry terms are explained, and sizes and lengths of all close, short, butt and special short nipples are listed. Method of stocking pipe nipples, order filling procedure, engineering specifications are covered. Pittsburgh Nipple Works, Inc.

138 **Sound Absorber**—Catalog SZ-55 features engineering data on SoundZorber—a wire-reinforced rubber pipe for eliminating noise and vibration from water lines. Details construction, operating characteristics, temperature and pressure ranges, and covers typical installations, noise, vibration and water hammer control, dimensions, acoustical impedance. Industrial Div., T. R. Finn & Co., Inc.

FANS, BLOWERS

140 **Axial Fans**—Bulletin B-1015, 36 pp, describes Series 203 axial fans for ventilation, process air supply and process air recirculation applications. Tubeaxial and vaneaxial flow principles are described and illustrated. Design and construction features as well as specific recommended applications are discussed, and photos are included. Selection tables and installation drawings giving detailed dimensions are given, along with shipping weights, friction and duct sizing charts, and conversion chart. American Blower Corp.

141 **Draft Fans**—This 8-pp bulletin describes and illustrates manufacturer's Galex Airfoil type draft fans, recently redesigned to take care of the more severe draft requirements of power plant operations. Features and operating principle are discussed. Also provided are specific speed curves, dimensions and selection data. The Green Fuel Economizer Co., Inc.

142 **Draft Inducers**—Sixteen-pp Bulletin I-56, on draft inducers for heating boilers and power plants, lists such new features as interchangeable inlet panels and fan drive through V-belt with motor mounted on a spring base to maintain belt tension. Typical installations are pictured and typical specifications included. Bulletin also contains a selection table for most heating plant installations and selection curves for use in selecting draft inducers for power plant installations. L. J. Wing Mfg. Co.

CONSTRUCTION

143 **Aluminum Roofing, Siding**—Form AD 528 is the 8-pp 1956 booklet on this company's aluminum roofing and siding products. Gravel stops, copings, siding, roofing and sandwich walls are illustrated and discussed briefly, along with installation procedure. Dimensional data and material specifications are included. Aluminum Co. of America.

144 **Sidewall Insulation Panels**—Form C-100 is offered as a design manual for wood fiber insulating panels used as outside wall insulation and for acoustical treatment in industrial and commercial buildings. Describes properties of material, provides installation data and specifications. Tectum Div., Peoples Research and Mfg. Co.

145 **How to Install Partitions**—Shown in 8-pp Bulletin 901 are photos of many installations of inexpensive partitioning in offices, hotels, industrial plants. These vary from railings to solid partitions 16-ft high, of fancy woods, plywood, plaster board, and glass. Unistrut Products Co.

146 **Glass Blocks**—This 24-pp catalog describes company's glass block and its functions, and lists various glass block patterns manufactured, including light and solar heat controlling blocks, with details on functional advantages of each specific pattern. Included are instructions and construction details for both large and small-size panel installations in steel, wood frame, brick or brick veneer construction. Table of dimensions; a section on how to calculate illumination and brightness; and tables on solar heat control and fuel savings included. Kimble Glass Co.

147 **Window Glass**—Bulletin L-2, illustrated in color, describes advantages of Lo-tran—a specially designed window glass said to "put sunglasses on buildings." Shows, through photos of typical installations, how the glass meets balanced brightness requirements; includes technical data. Houze Glass Corp.

148 **Panel Skylights**—This 6-pp catalog features company's prefabricated and pre-assembled aluminum and fiber glass panel skylights. Describes important design and construction features and includes photos, cutaway drawings, and standard specifications for various type skylight units. The Marco Co.

149 **Steel Floor Armor**—Uses of steel floor armor to prolong the life of floors are described in Form 503-955. Shows both application and installation of Hexsteel heavy duty floor armor and Floorsteel flexible type floor armor through simplified illustrations and engineering data. Includes detailed specifications for both products and instructions for determining proper size. Klemp Metal Grating Corp.

150 **For Sound Control**—Form B-101 is a basic design and installation brochure describing noncombustible wood fiber acoustical material for metal-T suspension systems. Covers basic properties of 24 x 48 in. panels, provides specifications, technical details, installation. Tectum Div., Peoples Research & Mfg. Co.

151 **High Strength Bolts**—Twenty-pp Bulletin HS-1 is designed as a working guide in the technique of joining structural steel members. Theory of bolting is explained, and technical findings are summarized. Identification of high strength bolts and proper sizes, comparisons with machine bolts, use of hardened washers, and good installation practices are covered, along with data on proper tightening, calibration of impact wrenches, air supply and inspection techniques. Tables of recommended torques included. Russell, Burdsall & Ward Bolt and Nut Co.

152 **Structural Fittings**—This 12-pp catalog presents the complete line of no-thread, no-weld Key-Lok structural fittings for use with any pipe, even scrap, to build storage racks, railings, maintenance stands and similar structures. Photos, line drawings and specifications are included. National Industrial Supplies Co.

INSTRUMENTS, CONTROLS

153 **Manometer Instruments**—Bulletin G-10 is a quick-reference guide to manometer-type instruments. Sets forth four basic types of manometers ranging from simple U-tube to ultra-precision models and provides selection tips. Specialized manometer instruments are also described for pressure, vacuum, flow and liquid level services as well as electrical contactor-type manometers and portable manometer kits. Range, working pressure, applications are given for each instrument. The Meriam Instrument Co.

154 **Optical Aids**—This 64-pp optics catalog lists over 1000 optical items and contains hundreds of illustrations of optical instruments and components. Industrial quality control tools, cost cutting, work speeding instruments for checking, measuring are shown, including magnifiers, microscopes, pocket comparators. Also includes war surplus optical bargains, instruments imported from foreign lands, telescopes and accessories, lenses, prisms, wedges, hand spectroscopes, reticles, mirrors and other equipment. Edmund Scientific Corp.

You'll save time in ordering Bulletins by using the Reader Service Cards provided on pages 207-208. Of course, we honor letterhead request—but it takes us a bit longer to handle them.

155 **Recording Instruments**—Catalog Section 40-55, 8-pp, features direct current ammeters, voltmeters and millivolt-voltmeters using the permanent-magnet moving-coil measuring elements. Describes component parts, contains charts and specification data. The Esterline-Angus Co., Inc.

156 **Off-Peak Control**—Bulletin GEC-981A, 12 pp, gives all the vital facts and figures on company's time switches and combination watt-hour meter-time switch for registration and control of off-peak water-heater load. Photos, diagrams and specifications are included. General Electric Co.

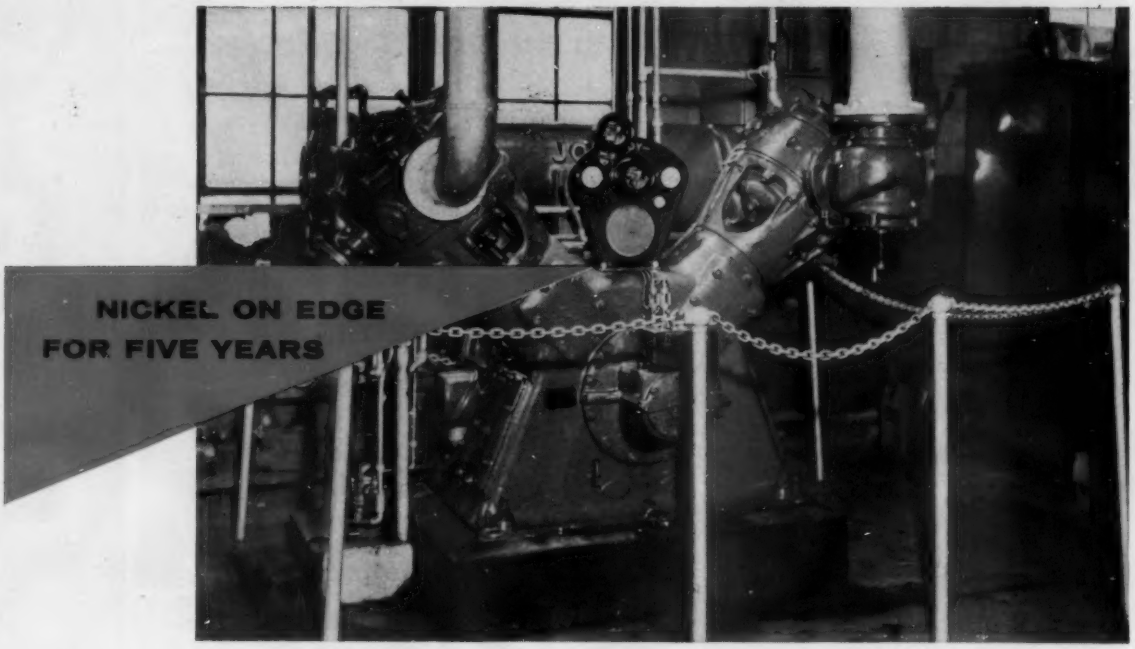
HEATERS, HEATING

158 **Heaters and Heating Devices**—Bulletin GEC-1005G, 60 pp, contains application index, calculating data, specifications, operating information, and list prices of standard heaters and heating devices. Included are immersion, strip, cartridge, tubular, fin, and railroad switch heaters; unit heaters, soldering irons, glue pots, soft-metal melting pots, oven equipment, and control. Process and application index shows methods of heating and type of heater recommended for various heating processes. General Electric Co.

159 **Induction Heaters**—Bulletin GEA-6388, 8 pp, gives specifications, dimensions, operating information, design features and ratings of a new line of electronic induction heaters. Explains how these heaters are task-sized to fit various applications. General Electric Co.

(More Bulletins on page 209)

Proof... the JOY WN-112 COMPRESSOR is Vibration-free



VICE PRESIDENT GEORGE F. FRANCK, of American Tank & Fabricating Company, Cleveland, writes about his Joy Compressor:

"Although the WN-112 has been in constant use for five years, we have experienced no trouble. It is vibrationless in operation . . . we are delighted with its performance."

The Joy WN-112 is a heavy-duty, continuous service, double-acting, water-cooled compressor with capacity from 378 to 974 CFM, 125 psi. Its vibrationless performance is the result of balanced V-vertical cylinder design with flange-mounted motor.

Other features of the WN-112 that assure efficient, quiet operation and long service are the exclusive Joy "Dual Cushion" valves, the *replaceable* cylinder and crosshead liners, full force-feed lubrication (even to the crosshead face), and oversize non-adjustable spherical-type main bearings.

For complete details on Joy WN-112 Compressors, write **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

A nickel was balanced on edge on this compressor (American Tank & Fabricating Company) when it was started up five years ago. It is still standing there!

Write for FREE Bulletin 90-15

Consult a Joy Engineer

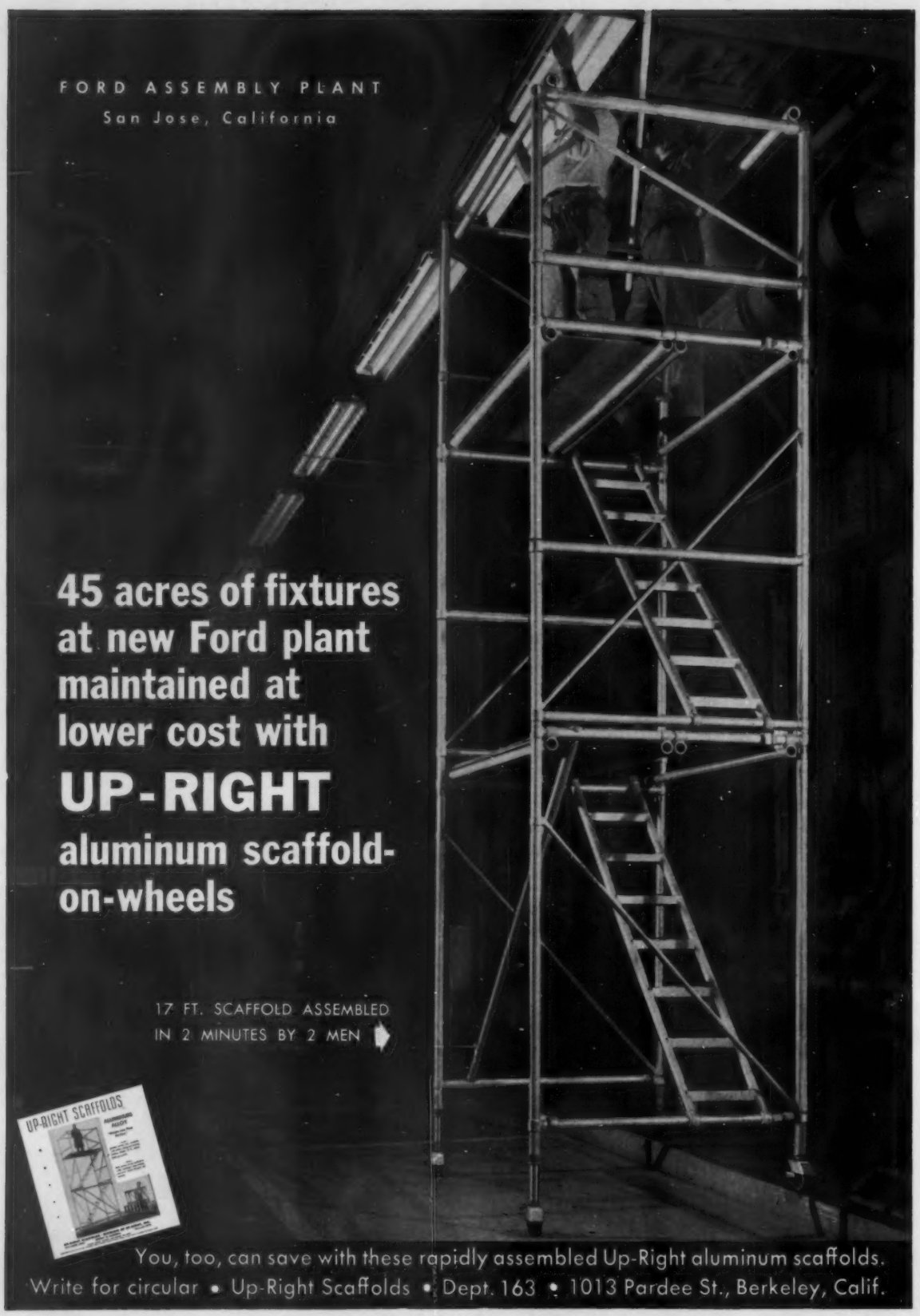
For Air and Gas Compressors, Oxygen and Nitrogen Generators, Vacuum Pumps and Boosters, Conveyors, Fans, Electrical Connectors, Hydraulic Fittings and Hose Assemblies.

WSW 16093-90

JOY

SPECIALISTS IN THE COMPRESSION AND MOVEMENT OF AIR AND GASES SINCE 1885

For more facts circle 516 on Reply Card

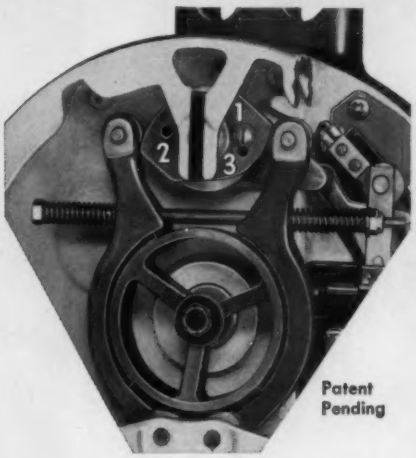

FORD ASSEMBLY PLANT
San Jose, California
45 acres of fixtures at new Ford plant maintained at lower cost with
UP-RIGHT
aluminum scaffold-on-wheels
17 FT. SCAFFOLD ASSEMBLED IN 2 MINUTES BY 2 MEN
UP-RIGHT SCAFFOLDS
You, too, can save with these rapidly assembled Up-Right aluminum scaffolds.
Write for circular • Up-Right Scaffolds • Dept. 163 • 1013 Pardee St., Berkeley, Calif.

For more facts circle 517 on Reply Card

For more facts circle 518 on Reply Card——→

ACCO products

The WRIGHT Hoists for Dependability



Patent Pending

Nothing to adjust but the cam!

Here's your assurance of maximum hoist service—minimum downtime. Adjustment of this cam-actuated brake to compensate for brake lining wear is simple as ABC.

When excessive load hook drift occurs...remove the screw shown at Position 1 (*see picture*), swing the cam until Position 2 is in line and replace the screw. That's all there is to it. For the final third of brake lining wear, set the cam at Position 3.

This is the only adjustment required. Brake springs and solenoid are factory-set and never need adjustment.

for complete information on WRIGHT Hoists and Crane components ask for:

Speedway Hoists: *(Frame 1) Booklet DH133B, (Frame 2 & 3) Catalog E55A* • ***Motor Driven Cranes:*** *Underhung, Single Bridge, Bulletin #227; Top Running, Bulletins #DH448 or DH449* • ***Crane Drive Units:*** *Booklet DH-431A* • ***Hand Traveling Cranes:*** *Bulletins #DH-469 and #DH-438A*

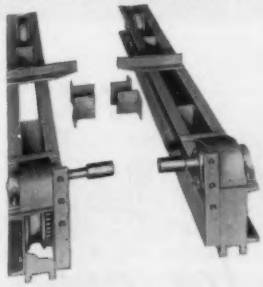
Write our YORK, PA., office

HOISTS, CRANES AND DRIVE UNITS TO FIT YOUR OPERATION

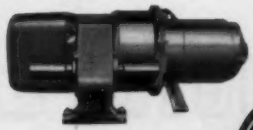
WRIGHT *Speedway* Hoists are designed to meet the many and varied demands of modern high speed production.

They are available in Frame 1, 1½, 2 and 3 sizes with capacities from ¼ to 10 tons.

WRIGHT B-514 Crane End Trucks are constructed of structural steel-welded steel channels equipped with heavy channel diaphragms. Truck wheels are equipped with Timken Tapered Roller Bearings (two to each wheel).



WRIGHT Crane Drive Unit consists of an electric motor with a fluid coupling transmitting power to a well proportioned gear reduction. It is designed for crane and double-beam trolley propulsion and similar intermittent duty reversing applications.



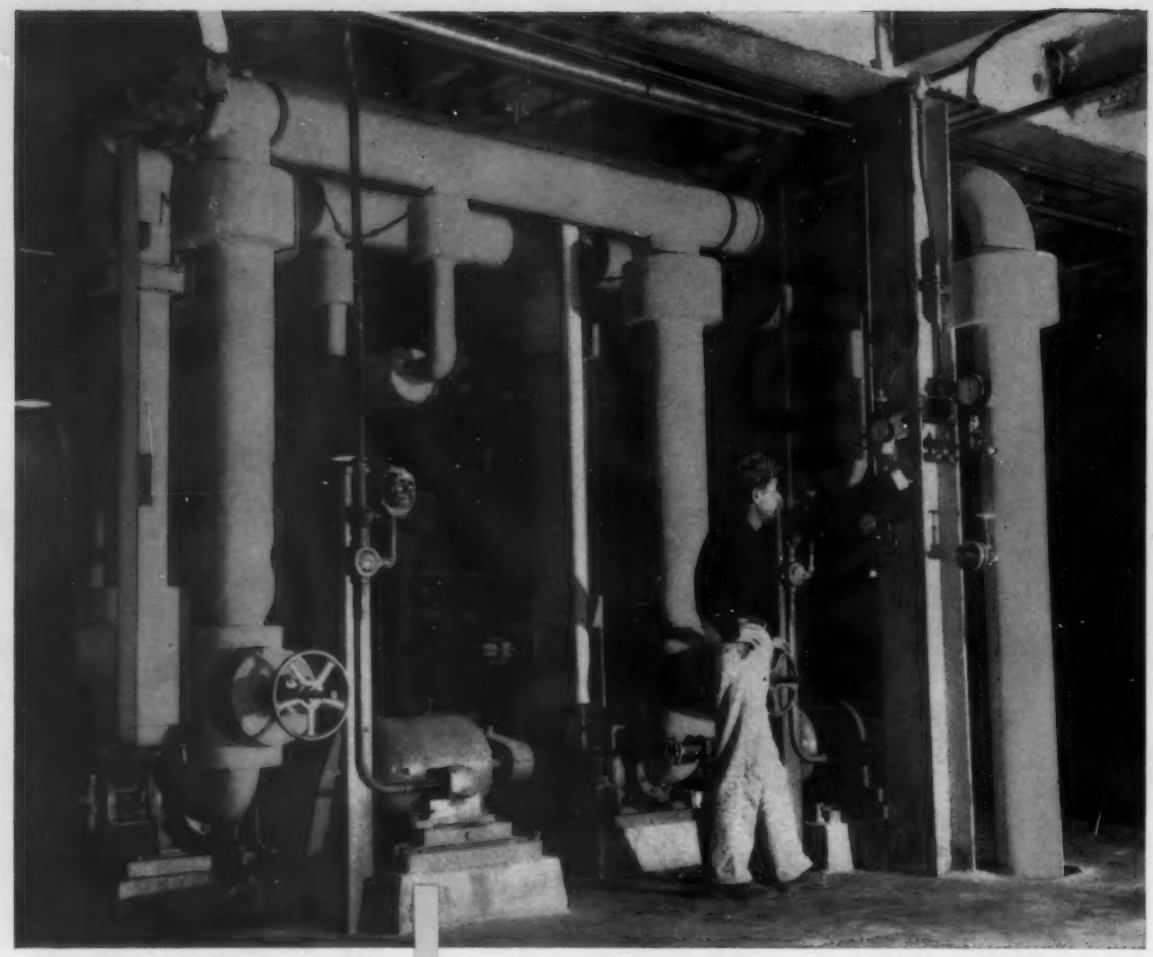
ACCO

Wright Hoist Division

AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

Better Value



Specify GUSTIN gb BACON SNAP*ON *for good and fitting reasons*

Plant piping takes on this trim, tailored look — and in record time — when you insulate with G-B Snap*On, the one-piece molded pipe insulation of fine glass fibers. From ¾" through 33" IPS and in 3' and 6' sections depending on pipe size. With just a pocket knife and a stock of Snap*On in nesting sizes, *anyone* can make easy work of the once-tedious job of insulating bends, valves and other fittings.

To fully understand why this material saves so much time and money on fittings and straight runs you need only handle a 6-foot section of Snap*On. It's flexible, yet resilient. It's feather-light, yet tough. It's almost impossible to damage, yet easy to cut with a knife. And to these obvious advantages, you can add such unseen benefits as *permanence* and the *highest thermal efficiency of any pipe insulation on the market.*

Next time you have hot or cold piping to insulate, call your nearby distributor, listed in the Yellow Pages under "G-B Insulations." In the meantime, write today for our new 8-page brochure with full details on "the first all-new pipe insulation in 60 years."

GUSTIN-BACON *Manufacturing Company* GUSTIN gb BACON

Thermal and acoustical glass fiber insulations • Pipe couplings and fittings • Railroad gaskets and supplies.

244 W. 10th St., Kansas City, Mo.

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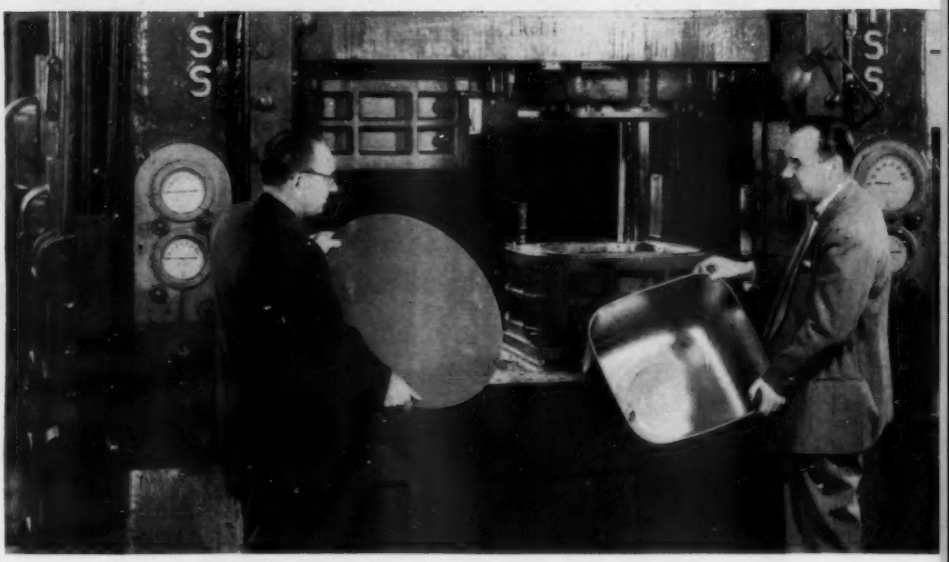
"We have no operating problems when we use STANOIL Industrial Oil"

Midwest Metal Stamping reports results of 8 years of press operation using STANOIL



Don Foster, Midwest Stamping Purchasing Agent and Jesse Nelson (right), Standard Oil industrial lubrication specialist, display metal blank and finished tub turned out on Bliss press. Technical service on lubrication problems is Jesse Nelson's job. He's been doing such work for seven years. Jesse has an engineering degree from the University of Iowa and is a graduate of the Standard Oil Sales Engineering School. Customers find this experience and training pay off *for them.*

In 1948, Midwest Metal Stamping Company, Kellogg, Iowa, put into service a Bliss Hydro Dynamic Press. STANOIL Industrial Oil was selected as the hydraulic medium. The initial fill was 1,400 gallons. The press operated continuously from 1948 until Christmas, 1954, when it was shut down five days for overhaul.

At the time of overhaul, the STANOIL Industrial Oil was drained. And here STANOIL'S superior demulsibility was demonstrated. Due to the high rate of condensation, two barrels of water were removed from oil reservoir. An oil analysis in the Standard Oil laboratory proved the oil still suitable for continued service. After filtration, it was returned to the reservoir and the press put back in operation. STANOIL continues to deliver the same perfect performance for Midwest as before.

STANOIL Industrial Oil can perform just as efficiently for you. Find out. There is a Standard Oil industrial lubrication specialist near you in any one of the Midwest and Rocky Mountain states. Call him. Or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

Stamping being removed from press by operator George Johnson. Press has used STANOIL Industrial Oil as hydraulic medium for eight years. Oil has perfect performance record.

STANDARD OIL COMPANY
(Indiana)

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STANDARD

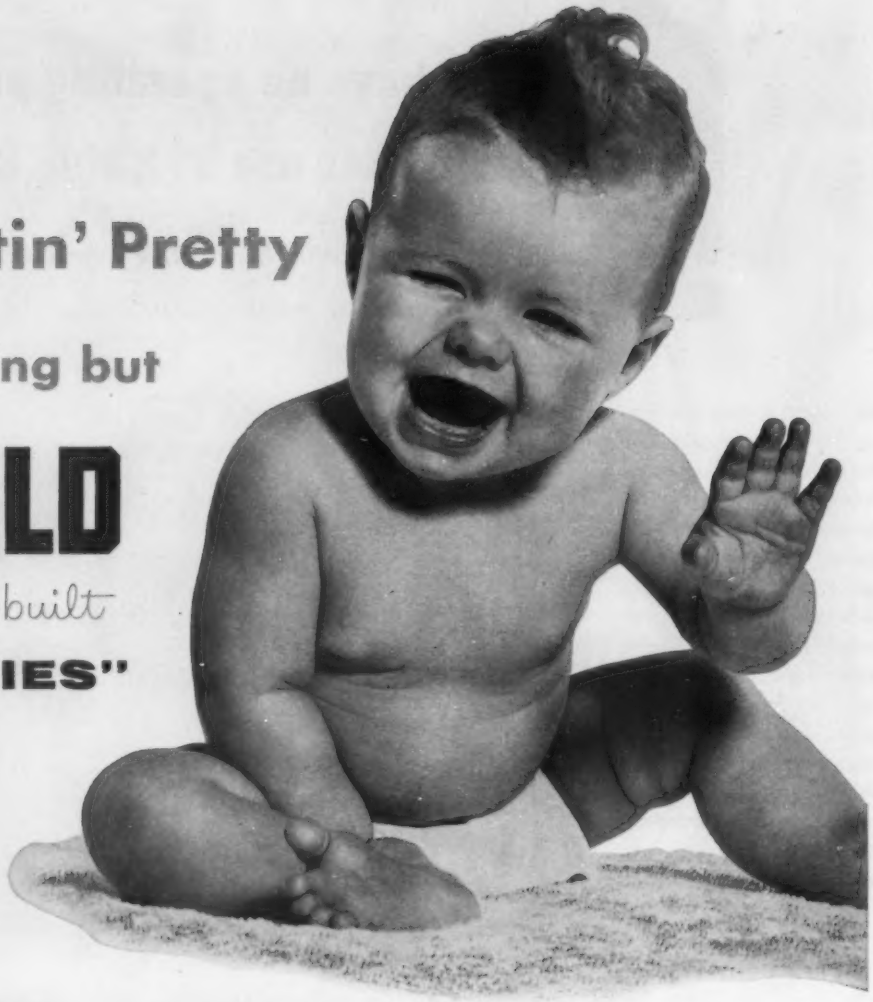
"I'm Sittin' Pretty

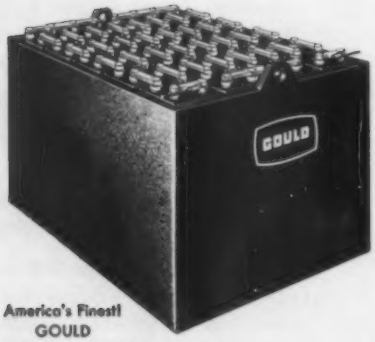
use nothing but

GOULD

Research-built

BATTERIES"





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GOULD
Industrial Truck Batteries

There are three big reasons why it pays to choose Gould Research-Built Batteries:

1. They are the finest batteries modern science can give you—research-built for longest service life.
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3. Gould Field Engineering Service, finest in the industry, nation-wide in scope, is as close to you as your telephone, always ready to see that your batteries are properly cared for and maintained . . . that you get maximum battery performance.

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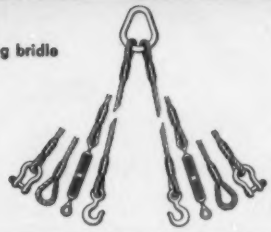
you get EXTRA STRENGTH with versatile

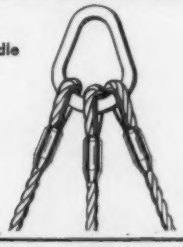
DURAGRIP
TRADE MARK
SLINGS

VERSATILE DURAGRIP SLINGS CAN BE USED IN THESE AND MANY OTHER ASSEMBLIES

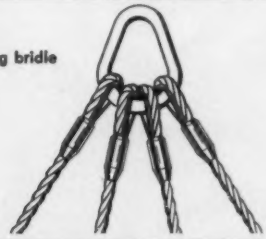
2 leg bridle



3 leg bridle



4 leg bridle



thimble splice with hook

thimble splice

It's easy to see why Wickwire's Duragrip Wire Rope Slings are becoming so popular throughout industry. They're properly designed and *they are extra safe because Duragrip Splices are used!* This means splices that have 100% of the strength of the rope from which they are made . . . splices that combine the advantages of hand splices and pressed fittings to give double assurance . . . splices free of protruding wire ends which can injure workers' hands.

What's more, there are other reasons why Wickwire Duragrip Slings are so dependable. They're always made from rope and fittings with matched rated capacities . . . made by a company which completely controls its sling production from iron ore through finished sling—your best assurance of the reliability that's so important to sling users.

Next time you need slings, check with your nearby, friendly Wickwire representative. He'll be glad to give you complete details on safe, versatile Duragrip Slings.

3831

WICKWIRE
WIRE ROPE SLINGS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Casper • Denver • Houston • Odessa (Tex.) • Phoenix
Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans
New York • Philadelphia

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Chempro Teflon impregnated asbestos packings provide the chemical resistance of Teflon and at the same time have the strength and resilience of asbestos. They are far superior to conventional lubricated asbestos packings, since the Teflon gives protection from chemical attack to the asbestos.

CHEMPRO STYLE 500 PACKING is designed for pumps and equipment handling hydrocarbons, light solvents and other volatile products. *Do not use on acid or strong caustics.* It is composed of 85% white asbestos yarn square plaited and thoroughly impregnated with Teflon.

CHEMPRO STYLE 600 PACKING is designed for applications handling acids, strong caustics and other corrosives. It is made of 100% Blue Cape asbestos, square plaited and thoroughly impregnated with Teflon.

Chempro Teflon impregnated asbestos packings are available in standard sizes from ⅛" up to 1¼", by ⅛", either on spools by the pound or in die molded or mandril cut rings or ring sets.

Ordering Information for Rings and Ring Sets

1. Give shaft diameter and stuffing box bore and depth.
2. Number of rings required.
3. For standard equipment, specify make and serial number.
4. State if seal cage is used.

THE ORIGINAL FABRICATORS OF TEFLON PACKINGS AND GASKETS

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CHEMICAL & POWER PRODUCTS, Inc.

7 Broadway, New York 4, N.Y.

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BACKTALK about our past issues

Edited by Marjorie E. Weissman

Pearl Harbor Request

PLANT ENGINEERING:

"This shipyard subscribes to PLANT ENGINEERING and files each copy in the Shipyard Technical Library. Occasionally desk or office copies of articles of particular interest to one department or section of the Shipyard are requested. Since we do not resort to "clipping" for obvious reasons, we are requesting your permission to photograph items in your publication of particular and timely value. Distribution of such reproductions will be confined to the department of this shipyard only." *J. P. Jones, Cdr, USN, Design Superintendent, Pearl Harbor Naval Shipyard.*

▶ You certainly have our blanket permission to reproduce, for your own use, material in PLANT ENGINEERING which would be of value to you.—*Editors.*

Queries on Plastisols

PLANT ENGINEERING:

"An article entitled 'Plastisols—Muscle Men in War on Corrosion,' by D. R. Meserve, United Chromium Division, Metal and Thermit Corporation, was published in the February, 1956 issue of PLANT ENGINEERING.

"We are interested. Could you supply us with the following information: source of raw material; equipment required to apply and cure; protective clothing required; and ventilation required.

"We would also appreciate any further information which would assist us in setting up an installation for applying this protective coating." *G. W. Lusby, Supervisor, Design Office, Plant Engineering, Ford Motor Company of Canada, Oakville Div., Oakville, Ont.*

▶ We are forwarding a copy of your letter to Mr. E. Buchwald at Burson-Marsteller Associates, Inc., 11 East 36th St., New York 16, N. Y., who will pass it on to the appropriate party at Metal and Thermit Corp.—*Editors.*

Chimney Repair

PLANT ENGINEERING:

"In the January, 1956 issue of PLANT ENGINEERING, there appeared an article in the Operation and Production section entitled 'Stack Reconditioning.' This article dealt with our company's experience using Goodyear Pliolite S-5 base paint in the repair of heavy duty chimneys.

"We would like to express our appreciation for your handling of this article and we are wondering if you would be kind enough to send us and bill us for 10 copies of the January issue.

"We are also considering having reprints made of this article and would like your permission for doing so." *M. S. Rosenthal, Div. Mgr., Chimney Engineering Service, St. Louis, Mo.*

▶ We are happy to grant our permission for you to reprint this article, asking only that credit be given to PLANT ENGINEERING, as the source.—*Editors.*

Copyrighted Seal

PLANT ENGINEERING:

"We note in the article 'The Amazing Plant of 2005 A.D.' in the January, 1956 issue of PLANT ENGINEERING that a model of the American Electronics manufacturing plant is shown. The plant uses the AE seal similar to that shown on this letterhead.

"The American Engineering Co. has been building good machinery with this seal for longer than we care to remember and it is, of course, covered by a copyright. We have jealously guarded the quality of the equipment on which this seal appears for a long, long time.

"We hope, therefore, that American Electronics can substitute something for this seal in the future and by the future we do not necessarily mean 2005 A.D." *J. S. Bennett, Vice President, American Engineering Co., Philadelphia, Pa.*

Two-Level Conveyor

PLANT ENGINEERING:

"We have just noticed the nice article on page 102 of the March issue of your magazine on our Towveyor installation at Zenith Radio, Chicago, Ill., and would appreciate your permission to reprint the story. PLANT ENGINEERING will be given credit, of course. Also, would like to have you send us the picture marked 'Fig. 2' on page 103. We do not have this particular picture in our files, so if we reprint the article, we'll need it." *L. E. Gannon, Advertising Manager, Jervis B. Webb Company, Detroit, Mich.*

▶ Glad to give permission to reprint the article, with credit to PLANT ENGINEERING, as you indicate.—*Editors.*

Stud Driving Tool

PLANT ENGINEERING:

"Please send me illustrated folders, price lists and other information for the stud driving hand tool described and illustrated on page 107 of the March, 1956 issue of PLANT ENGINEERING." *D. Brayer, Plant Engineer, General Electric Co., Fort Wayne, Ind.*

PLANT ENGINEERING:

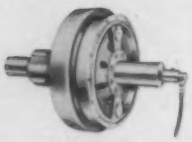
"We should be pleased to receive illustrated folders, complete price lists and any additional information available concerning stud driving equipment illus-

In water conditioning... there's one way to be sure!

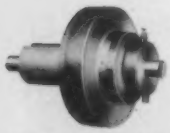
CONSULTANTS ON INDUSTRIAL WATER PROBLEMS

W. H. & L. D. BETZ, Philadelphia, Pa.

DODGE PRODUCTS you should know



AIR-GRIP CLUTCHES



DIAMOND-D CLUTCHES

ROLLING GRIP CLUTCHES

FREE!

New Engineering Catalog. 320 pages of helpful information on Dodge products, including sectional drawings, dimensions, prices, application details, engineering tables. Virtually a manual on mechanical power transmission machinery. Sent free if requested on your company letterhead. Please give your title.

DODGE MANUFACTURING CORPORATION
2700 Union Street • Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

For more facts circle 525 on Reply Card

BACKTALK

trated on page 107 of your March, 1956, issue." *J. W. Lautenberger, Division Chemical Co., Div. of W. R. Grace & Co., Baltimore 3, Md.*

▶ Your names and addresses have been forwarded to the Hilti Rapid Fastening Systems, Inc., 55 Vandam St., New York 13, N. Y., asking them to send you the information you request.—*Editors.*

No Cartridge in This Tool

PLANT ENGINEERING:

"In the article 'Stud Driving With a New Hand Tool' on page 107 of the March, 1956 issue of PLANT ENGINEERING, it states, 'the only power needed is that provided by a few strokes from a 2 or 3 lb hammer.' Does this mean that no special cartridge is needed?

"From what I have read, the tool seems to be a handy one." *Albert Stipek.*

▶ The statement in PLANT ENGINEERING that no cartridge is required for this stud-driving tool is quite correct. The only drive force necessary is that provided by the hammer.—*Editors.*

PLANT ENGINEERING:

"I wish to thank you for your prompt and informative reply. Your magazine PLANT ENGINEERING is always chock full of information and new ideas, it is indeed a most welcome item around our plant. I might add that your magazine is also well planned and arranged." *Albert Stipek, American Manganese Steel Division, American Brake Shoe Company, Chicago Heights, Ill.*

Memory for Washing Machines

PLANT ENGINEERING:

"We note with interest the article entitled 'Industry's New Magnetic Midgets' in the January, 1956 PLANT ENGINEERING, and especially the reference to sequency.

"We have need for a sequencing instrument with a memory in connection with our automatic drum washing machines. The instrument you describe may be a possible answer.

"Our 55-gal drums are washed in an eight-station machine and are moved progressively from one station to the next by a 'walking beam'. As each drum is positioned at a station, a jet of hot water is allowed to flow through a solenoid valve. The jet flows for the eight seconds that the drum remains at the station. About four seconds is required to transfer a drum from one station to the next. The transfer and wash time is controlled by a timer through electrical relays which in turn operate the motor which powers the walking beam.

"The flow of water at each station is controlled by the station's own solenoid valve and normally a drum will be in position at each station so that all solenoids are in operation during the wash cycle.

"However, to conserve water, it is expedient that a solenoid valve at any station operate only if a drum is actually on that particular station. It does occasionally happen that a drum will not be ready to enter the washer and a blank space will result in the washer working progressively from station 1 to station 8. It is because of these blank spaces that a memory circuit is required. That is, if a drum is not ready to enter at station 1, then an impulse should not be delivered to the solenoid at station 1 and, as the blank space moves progressively down the line, the solenoid valves at the respective stations would not be operated.

"We think the 'Magnetic Midget' may be helpful for this particular application." *P. H. Steed, Engineering Department, The Coca-Cola Company, New York, N. Y.*

▶ We are forwarding a copy of your letter to Mr. A. E. Young, Jr., Berkeley Division, Beckman Instruments, Inc., 2200 Wright Ave., Richmond 3, Calif., who will pass it to the appropriate party to answer your queries.—*Editors.*

Advice on Grouting Problems

PLANT ENGINEERING:

"We are experiencing some difficulty with the grouting under our 112-in. wood chipper. The grouting is cracking and breaking up.

"We are therefore, looking for information on the correct and accepted practices for mounting this sort of heavy equipment on a concrete foundation.

"What type of grouting should be used? How should it be installed? Should the machinery hold-down bolts be tight before the grout is installed? Is it a good idea to use a torque wrench to make sure each hold-down bolt is taking its share of the load? If you can answer any of these questions or inform us where we can get the answers, it will be appreciated." *G. H. Stevenson, Assistant Engineer, Coos Bay Pulp Corp., Empire, Ore.*

▶ We are sending you a set of tear sheets and a set of photostats of two articles published some time ago in PLANT ENGINEERING on the subject of grouting for heavy machine installation. We believe that they will answer your questions.

We regret that our supply of tear sheets of both these articles is exhausted, but readers can obtain photostats at 60 cents a page—Seven in all.—*Editors.*

Ventilation System

PLANT ENGINEERING:

"I would appreciate receiving a tear sheet of your very interesting article entitled 'Why Use "Push-Pull" Ventilation' on page 118 of the February, 1956 issue of PLANT ENGINEERING." *Francis D. Donovon, Division Engineer, H. N. Hartwell and Sons, Inc., Industrial Plastics Division, Boston, Mass.*

How Drives have changed in these last few years!

DODGE
of Mishawaka, Ind.

In terms of present day labor costs modern mechanical power transmission is the greatest bargain ever. Drives are simpler, smoother, more dependable; they open the way to important savings—in power, in costs of installation, in maintenance, in elimination of down-time. Want to appraise your plant and machines? Ask yourself these questions:

Are you using TAPER-LOCK and taking advantage of its unique interchangeability? ONE bushing fits sheaves, sprockets, couplings and conveyor pulleys—to give you inventory economy AND quick, easy changeovers.

Are you using TORQUE-ARM, the shaft-mounted speed reducer? Costs less, delivers more! 97% efficiency. So little installation problem you will find it a most versatile reduction drive—changeovers in a minimum of down-time.

Are you using FLEXIDYNE, the Dry Fluid Drive? The new answer to two age-old problems—starting heavy inertia loads and insuring overload protection. 100% efficiency at full load. Magic performance!

Call the Transmissioneer, **your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified phone directory.**

These are just <u>three</u> of the modern products Dodge offers to improve your drives—to give you measurable advantages in smooth operation and production economy. You can't lose by investigating. Why don't you begin by writing for our bulletins on (1) TAPER-LOCK, (2) TORQUE-ARM, (3) FLEXIDYNE?

DODGE MANUFACTURING CORPORATION, 2700 Union Street, Mishawaka, Indiana

For more facts circle 526 on Reply Card

Solve Lubricant Application Problems . . . Slash Operating Costs . . . Boost Production with

Lincoln LUBRICATION SYSTEMS

Whatever your lubricant application problem may be . . . automated production lines . . . a low cost automatic system for original equipment, or positive, reliable maintenance of existing facilities, Lincoln has the most modern device or complete system to meet your particular requirement.

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Complete selection of 26 Systems to meet every application. New Multi-Luber* System illustrated (manual or air operated).

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(For Original 100 lb. or 400 lb. Drums)
Complete selection of Air-Motors and Pump Tubes.

GREASE GUNS (Heavy Duty Steel Construction)
Lube Capacities from 16 oz. to 32 oz.

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From Hydraulic Ball-In-Head to Self-Tapping.

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(Electric or Air Operated)
Lube Capacities from 30 lbs. to 60 lbs

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Heavy Duty, spring actuated.

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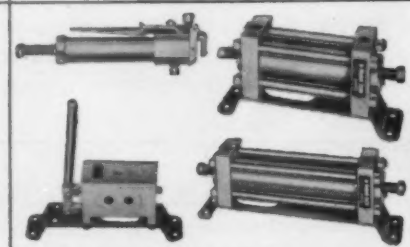
(Portable-Steel Construction)
High and Low Pressure Models.

POWER-OPERATED TRANSFER PUMPS
(For Transferring Lubricants and Fluids From Original Drums)
Empties 55 gal. drum of S.A.E. 30 oil in two minutes.

MATERIALS DISPENSING SYSTEMS
(Power Operated for Pole, Spray or Flo Gun Applications)
Complete Systems for Original 400 lb. Drums, or 5 gal. Packages.



MEASURING VALVE SYSTEMS
(Foot or Hand Actuated—Any Capacity)
For Injecting Metered Quantities of Lubricant on Assembly Lines.

Here's how to simplify **specification and purchasing . . . write for Lincoln's new Engineering Catalogs: No. 91 Fittings and Devices for O.E.M.; No. 80-1 Centralized Lubrication Systems; No. 64 Equipment For Productive Maintenance of Industrial Machinery; No. 41 Power-Operated Materials Dispensing Systems; and No. 31 Complete Portable Lubrication Departments For Contractors.**

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For more facts circle 528 on Reply Card →

Satisfaction

...you get it every time you use a P&H Hoist

If we were asked to name the one thing that has contributed most to the popularity of P&H Hoists throughout the years — we'd have to say it is the warm approval of our customers. In short — they're satisfied.

Many of our customers use hundreds of P&H Hoists to speed materials handling. Scattered throughout the country you will find these hoists at work in the most diversified industries.

The satisfaction expressed by these users stems from notable savings in time and labor, and a cost of operation that, in some instances, dropped to as low as 10¢ per day! And because they've been satisfied, these customers repeat their purchases of P&H Hoists again and again.

Case histories, identifying users by name and telling of savings made through the use of P&H Hoists, are yours for the asking. See your nearest P&H Hoist distributor, or send us your name and address on your company letterhead.

HARNISCHFEGER

MILWAUKEE 46, WISCONSIN

the P&H *Line*

TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PREFABRICATED HOMES · HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

3121

Satisfaction

...is a by-product of every P&H Overhead Crane

You get satisfaction from many things when you own a P&H Overhead Crane. First of all, you have the personal satisfaction of knowing that you've made a good, solid, substantial investment.

Then you have the satisfaction of quick, efficient service. You get it from one responsible source—there's no time lost in determining whom to call when you need quick action.

You have the satisfaction of smooth, effortless performance experienced by all P&H Overhead Crane users. And you get the added bonus of continued low maintenance costs.

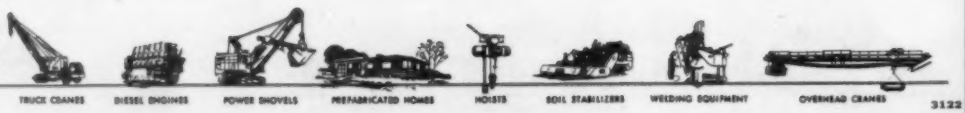
But most of all, you get the kind of satisfaction from a P&H Overhead Crane that prompts you to buy another when you need it. This is a fact borne out by our experience. Twelve of our largest users employ a total of over 4,000 P&H Cranes in their various plants.

Remember to call in P&H engineers when you contemplate a new building with a crane installation. Meanwhile you may want to look over the free literature available. Just drop us a note on your letterhead.

HARNISCHFEGER

MILWAUKEE 46, WISCONSIN

the P&H *Line*



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3122

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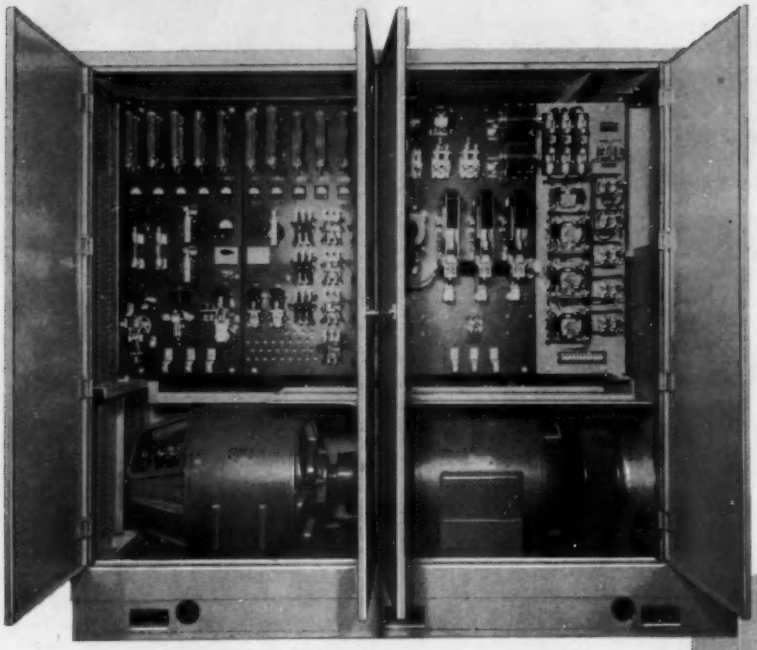
ELLIOTT C-W Adjustable Speed Drives

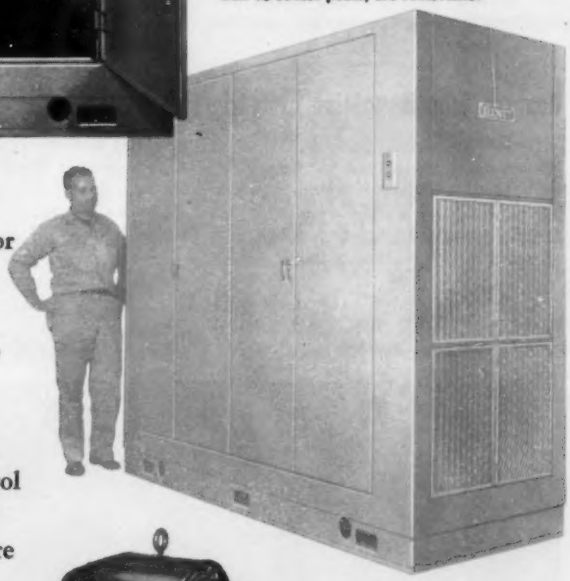
are your answer for...

- Speed Adjustment
- Positive Stopping
- Reversing
- Dynamic Braking
- Pre-set Speed
- Multi-motor Drive
- Jogging or Creep Speeds
- Automatic Acceleration or Deceleration
- Torque Limit Protection
- Visual Speed Indication
- and many other complex operating conditions

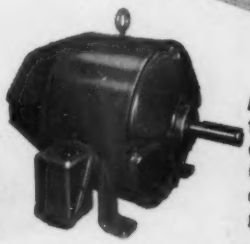


A control cabinet houses the a-c to d-c conversion unit, plus the control required for the particular application. At left is a 100-hp package.

Power unit is housed in a pressurized sheet-metal cabinet with incoming air passing through filters, insuring long life and low maintenance costs. Cabinet has doors, front and rear, for easy access; doors, as well as center posts, are removable.



THESE PRE-ASSEMBLED, PRE-WIRED, easily installed power packages meet today's needs for flexible d-c motor performance from a-c power supply. They are designed for ratings up to 200 hp; speed ranges to 16:1 and up; 208, 220, 440 or 550 volts; 25, 50 or 60 cycles; 2 or 3 phase operation. Many modifications can be provided to meet special operating conditions. All components—power conversion and control—are backed by the Elliott Company's more than half-century experience in the manufacture and application of industrial drives. For complete information, write Elliott Company, Crocker-Wheeler Division, Jeannette, Pa.



A typical Elliott C-W d-c motor for use with adjustable speed drives. In addition to dripproof (shown) Elliott offers totally-enclosed, integral brakemotors and gearmotors.

ELLIOTT Company

TURBINE-GENERATORS TURBINES MOTORS GENERATORS DEAERATING HEATERS EJECTORS CONDENSERS COMPRESSORS TURBOCHARGERS TUBE CLEANERS STRAINERS

For more facts circle 529 on Reply Card

PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Edited by Marjorie E. Weissman

Replacing V-Belts

WHEN MULTIPLE V-belts are replaced because of wear, several points should be observed to obtain good service from the replacement belts. Normally the original belts are selected and, in some cases, installed by the original manufacturer in sets matched for equal length.

When the belts have served their expected life, the sheaves or pulleys will be from one-half to fully worn out. Frequently, replacement belts are installed on badly or unevenly worn pulleys. This will drastically reduce their life expectancy.

The pulleys should be examined for roughness in the grooves which will cause excessive wear and preferably replaced at the same time as the belts.

The grooves should be checked for uneven wear. The belts may be matched but not the grooves. To check for uneven groove wear, move the matched belts from groove to groove and test for difference in play. If uneven tension is observed, the pulleys should be replaced.

The replacement belts should be of the same type and construction as the original.

If stored, belts with approximately the same storage life under similar storage conditions, should be used to obtain matched sets. *From a release of Thermoid Company, Trenton, N. J.*

Electronic Inspection of Wire Rope

AUTOMATIC inspection equipment is the newest tool with which an operator can detect flaws in wire rope at our New Haven, Conn., and Trenton, N. J. plants. The equipment operates electronically and is capable of detecting a single defective wire in a group of 222 individual wires stranded together.

Basic principle of the inspection device is the creation of a magnetic field

Each wire of 150-strand rope is inspected as it passes through electronic device. Defects light signal at left

by a constant power source in the core of the sensing coil. Since the wire rope itself forms an integral component of the system as a balanced and calibrated unit, irregularities in the rope passing through the sensing coil change the density of the magnetic field. These defects are measured and calibrated as output signals which are in excess of a pre-determined range.

The sensing, or pick-up coil, controlled from a panel, energizes appropriate electronic relays which cause a warning light to flash or paint to be sprayed on the product at the point of imperfection, or cause the operation to stop completely. These alarms enable the operator to eliminate a faulty section in the product under inspection.

A permanent record of all product examinations and quality control is automatically recorded during the inspection. *From a release of American Steel & Wire Division of U.S. Steel Corporation, Cleveland, Ohio.*

Reactor Tube Inspection by Movie Camera

CHECKING FOR possible damage caused by uranium fuel in the aluminum tubes of chain-reaction reactors at the Hanford atomic plant operated for the Atomic Energy Commission, is accomplished by taking a movie of the inside of the tubes.

To take the film, a long "telescope" is attached to a movie camera equipped with a wide angle (120 deg) lens at one end and additional lenses are inserted along it. As the telescope moves through the pipe, it projects a traveling image of the tube interior upon successive frames of the film.

Film gives visual effect similar to that of driving through a tunnel, with a clear view of any damage present. *From a release of General Electric Company, Schenectady, New York.*

Inside of reactor tube is filmed by "telescope" equipped with wide-angle lens

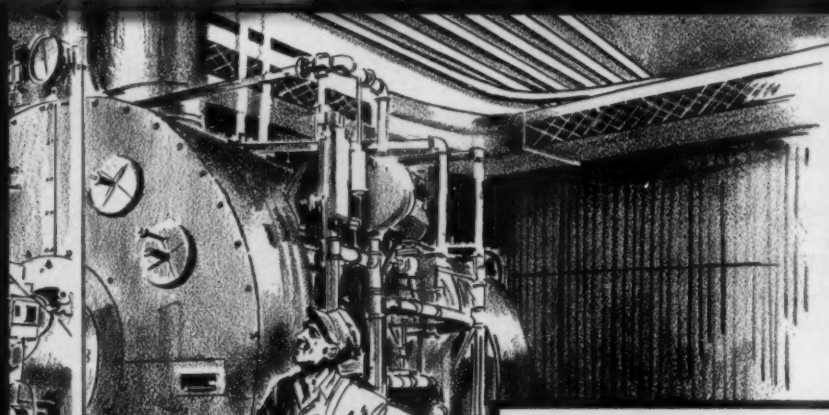
Plastic Ducts Carry Acid Fumes

METAL DUCTS for carrying mixed acid fumes at 170 F in a chemical plant in Niagara Falls, N. Y., were installed in 1954. Shortly after installation, corrosion appeared at the welds and within 60 days the ducts failed completely. A different metal was then used, but after a few months' service the ducts required extensive repairs. After 11 months they, too, failed.

After testing a variety of materials for corrosion resistance, the company replaced the ducts with ones made of

(Continued on page 38)

For more facts circle 530 on Reply Card ——→

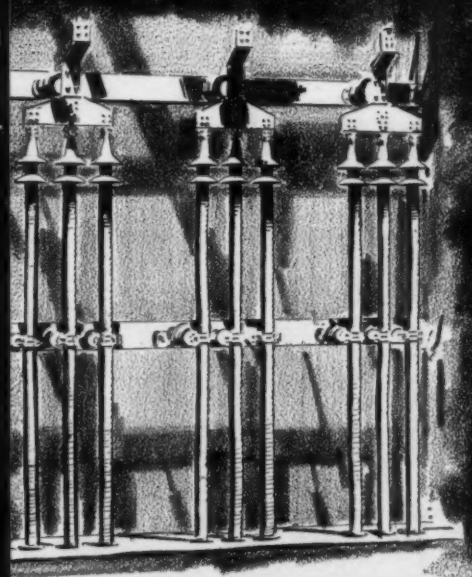


1. in hot places

Exceptionally resistant to the deteriorating effects of heat, Hazard Keystone insulation is designed for operation at copper temperatures up to 85 C. This makes it especially useful in boiler rooms, crowded ducts and other locations where there is a high ambient temperature.

3 spots where

KEYSTONE-INSULATED CABLES *pay extra dividends in failure-free operation*



2. high ozone concentrations

Because of its stable chemical characteristics, Hazard Keystone insulation provides an extremely high degree of resistance to ozone and corona cutting. It withstands a longer test period and sharper bends than required by IPCEA and ASTM for ozone-resistant compounds. This assures maximum reliability in high voltage installations where ozone is always present.

3. in moist locations

Keystone-insulated cables may be used anywhere . . . in damp places or even for direct burial. Tests show that Keystone insulation does not absorb appreciable amounts of moisture even when immersed directly in water. Electrical and physical characteristics remain stable regardless of the moisture present in installations.

Send for the complete story as detailed in Bulletin H-463. Here are the results of twelve years of field service and tests, reported with charts and graphs of test results, together with 36 pages of technical data to aid in specifying and installing the proper cable for the job. Write to Hazard Insulated Wire Works, Division of the Okonite Company, Passaic, N. J.

3652

HAZARD PRODUCT OF OKONITE RESEARCH INSULATED CABLES

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

Glass fiber reinforced plastic ducts are giving good service handling acid fumes

polyester Fiberglas-reinforced plastic, engineered by duVerre, Inc., Buffalo, N.Y. In use for five months, the ducts show no sign of deterioration.

The polyester systems are not suitable for use with strong alkalis or very high temperatures. *From a release of Owens-Corning Fiberglas Corporation, Toledo, Ohio.*

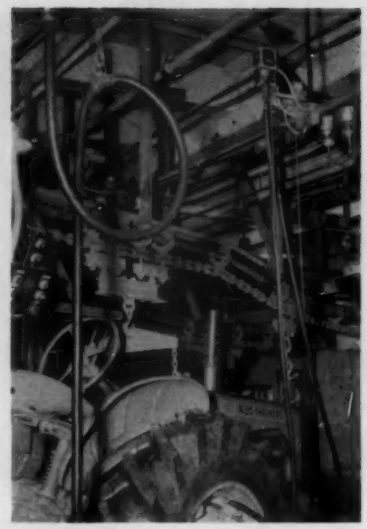
Assembly Line Tire Inflation

TIRES ON tractors coming off the assembly line at the Tractor Division, Allis-Chalmers Manufacturing Company, Milwaukee, Wis., are inflated in 20 per cent of the time formerly required.

Previously, the tires were inflated at a point removed from the assembly line, but with the introduction of a new assembly system, the tires had to be inflated as the tractors moved along the overhead conveyor line. The old method did not prove quick enough for this arrangement, so the reducing valve, originally used in the compressed air-line was replaced by a regulator and solenoid valve.

The regulator closes the valve when the required tire pressure of 30 lb is satisfied. When the air hose is attached to the valve stem the regulator unit opens the solenoid and air at 90 lb pressure enters the tire.

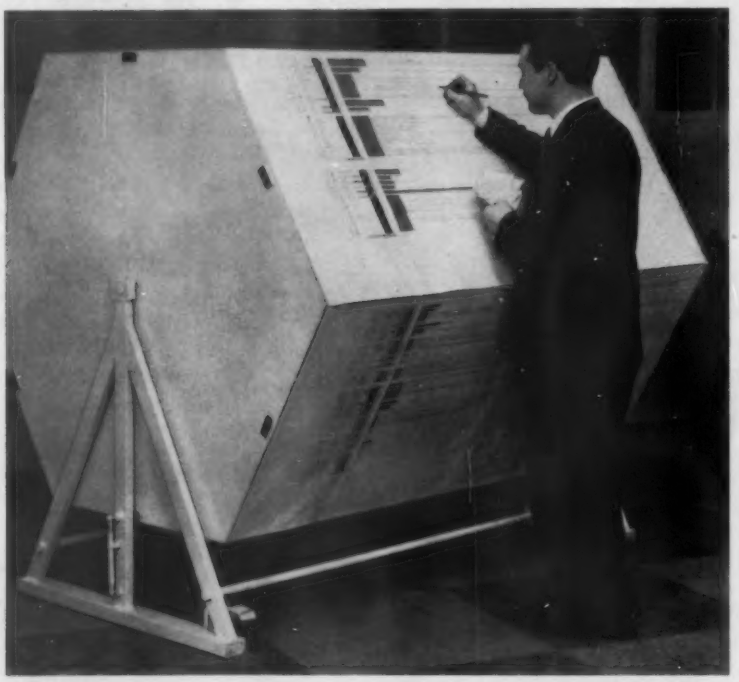
This surge of air satisfies the tire pressure almost immediately and the solenoid is closed. This causes the pressure in the line between the solenoid valve and the tire to equalize at less than 30 lb, so the regulator again opens the solenoid valve to compressed air. These on-off pulsations are repeated until the tire is inflated to the correct pressure.



Tractor tire inflation time has been reduced by replacing a reducing valve with regulator (arrow), solenoid valve

The inflation operation takes only a fraction of the former time required and greater accuracy is obtained with the new method. *From Industrial Control News, published by Industrial Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.*

Hexagonal Drums Aid Production Control System



Six-sided drums have taken the place of wall charts and graphs in the production control system at Teddington Aircraft Controls Ltd., Merthyr Tydfil, Wales. Data on more than 500 products is entered on similar drums. Foot pedal locks drum into position for use. (From Target, published in London, England)

Sandwich Panels For Plant

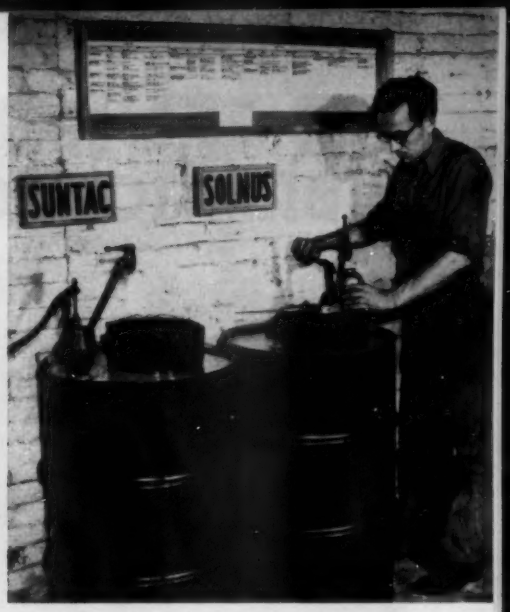
WHEN THE NEED arose for additional manufacturing space at the Burke E. Porter Machinery Company in Grand Rapids, Mich., sandwich panel type curtain walls were selected as the construction material.

The panels used are made of polyester resin-impregnated, glass fiber reinforced cloth bonded to sheets of cement asbestos board. These sheets are, in turn, bonded to an insulating core of expanded polystyrene, all together forming a panel 2¼ in. thick, with opaque white surfaces on each side. No further finishing is necessary to provide protection for the panels.

The new plant was constructed on a concrete foundation slab of 8480 sq ft. Steel framework was designed to accommodate sandwich panels measuring 4 ft by 8 ft, for the curtain walls, which consist of lower panels hung vertically, a center panel of glass windows and a top section formed by hanging the panels horizontally.

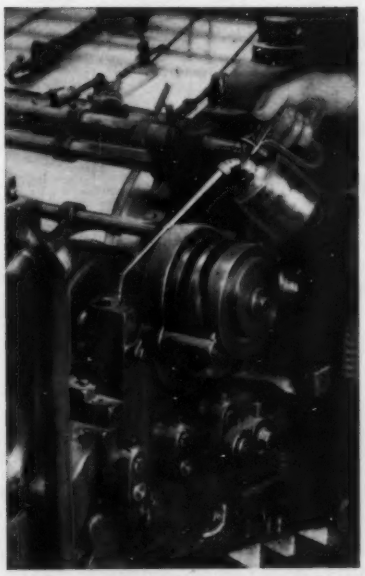
(Continued on page 40)

Seven Products Replace Twelve. Sun representatives show how Sun's plan of industrial lubrication and preventive maintenance benefit management.



Over 70% of all plant equipment is now lubricated by only two moderately priced oils.

How A Sun Engineer Helped Cut Lubrication Costs by 15%... Reduce Oil Inventory by 42%



Maintenance Is Easier. Sun's plan helps prevent mistakes... reduces chances of applying wrong lubricant.

For years, department foremen of a large folding box plant purchased "special" lubricants to meet individual needs. Throughout the plant, a total of twelve products were being used...some extremely high in price.

The man from Sun called management's attention to this fact. He pointed out that much of the plant equipment, although different in name and function, was mechanically the same. He proved that over 70% of the equipment could be lubricated by two products instead of several lubricants basically alike.

Today, as a result of Sun's recommendations, "special" lubricants are gone; costs of lubrication are down 15%; and, oil inventories are reduced by 42%.

For the full story about how Sun can simplify lubrication setups and save on oil costs...see your Sun representative or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. PY-5.

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

For more facts circle 531 on Reply Card

KORFUND VIBRATION CONTROL

Stops NOISE Complaints

Increases Employee Efficiency

This large punch press, installed on an upper floor, had both neighbors and employees complaining about shock and noise—the rubber mounts used by the company just couldn't do the job. Korfund engineers recommended mounting the press on four Steel-Spring Vibro-Isolators. This was speedily done—since the Isolators' built-in leveling screws eliminate shims, and lagging to the floor was not necessary. The neighbors' complaints stopped immediately, and employee efficiency increased.

Of course, all our installations are not as critical as this—on some, the major requirements are eliminating foundation bolts and leveling the equipment. In cases such as these, plant engineers are enthusiastic about Korfund LEV-ELASTO Dampers—the lowest cost adjustable leveling mount on the market.

Solving vibration control and machinery mounting problems is Korfund's specialty. We have more than a half-century of experience in the field. Our experience lets us recommend "the right way the first time"—no trial-and-error basis is necessary.

All Korfund products are designed to provide equipment mobility by eliminating bolting equipment to the floor, and to provide leveling where necessary.

Reserve your copy of the booklet "The Plant Engineer's Guide", coming soon. Write for Bulletin 29.

For specific recommendations contact us or one of the 46 local Korfund offices. Look under "Korfund" in your local Telephone Directory or in Thomas' Register.

THE KORFUND CO., INC.

KORFUND VIBRATION CONTROL — SPRINGS — RUBBER — CORK

48-35R Thirty Second Place, Long Island City 1, N. Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

For more facts circle 532 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

Sandwich panels with built-in insulation used in construction of industrial plant

The lower edge of each panel was grooved to fit into a steel spline in the base plate and sealed in place with tar-mastic. Panels were joined together with splines of expanded polystyrene inserted into the pre-cut panel edges, providing air tight and water tight joints. No mastic or adhesive was necessary. The entire curtain wall was hung in 85 man-hours. *From a release of Haskelite Manufacturing Corp., Grand Rapids, Mich.*

Nylon Cleans Railroad Cars

DURING a 30-month period, the Rock Island Railroad washed an estimated 100,000 railroad passenger cars. Three sets of vegetable bristle brushes were used and worn out, while a set of nylon bristle brushes wore down 0.46 in. Since each nylon brush outlasted eight made of natural bristles, the use of the nylon brushes brought a reduction in cleaning costs of 40 per cent. *From a release of E. I. du Pont de Nemours & Company, Wilmington, Delaware.*

Automatic Heat Treating Line

ONE MAN operates the fully automatic heat treating equipment, designed and built by the combustion engineering department of The National Supply Company in the Spang-

THINKING of REVISING YOUR PLANT LAYOUT?

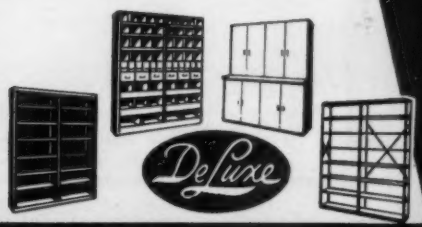
(Then How Can You Settle For Less . . . When The Best Costs No More)

Write For This Big 48-Page DeLuxe Reference Manual. Ask For Details Of Our "PLANT LAYOUT SERVICE", Yours Without Obligation.

ANOTHER GOOD REASON WHY YOU SHOULD CONSIDER DeLuxe

Factory imbedded shelf reinforcing eliminates countless installation hours of bolting-in conventional shelf reinforcing in the field. DELUXE does this job for you!

It certainly isn't difficult to see how DELUXE steel shelving saves you needless expense and set-up headaches right up and down the line. Special components are designed to make the erection almost child's play . . . units to fit any operation now, or later are built to your specific plant layout. You are not plagued with a lot of "extras"; a DELUXE installation is *complete*. Heavy gauge materials . . . throughout. DELUXE shelving is *fully* finished. Without reservation, you have protected your shelving investment for *all time* with DELUXE. Comparison will prove there's no "double talk" here!



DELUXE METAL FURNITURE COMPANY
WARREN, PENNSYLVANIA

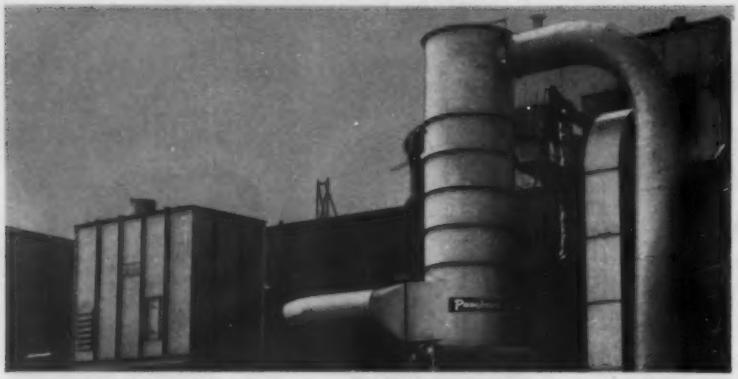
A DIVISION OF THE ROYAL METAL MFG. CO.

Manufacturers of "Verti-File", "Templa-File", and quality factory furniture for over a quarter of a century.

THERE IS A DeLuxe FACTORY TRAINED REPRESENTATIVE AS NEAR TO YOU AS YOUR TELEPHONE.

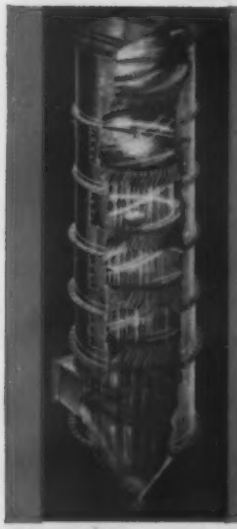
For more facts circle 533 on Reply Card

NOW...for efficient wet dust control



FARRELL-CHEEK STEEL CO., Sandusky, Ohio, uses a Pangborn Cloth Screen Collector for dry dust and a new Pangborn Centrifugal Wet Collector for hot and moist dust from shakeout and burning stations. According to Farrell-Cheek, "We are well-pleased with the Pangborn Wet Collector. It does its job efficiently, economically, and we have encountered no maintenance difficulties whatever."

Pangborn Centrifugal Wet Collector



For effective control of hot, moist, inflammable, abrasive, corrosive and obnoxious dust

Effective interaction of air and water explains the efficient performance of this new Centrifugal Wet Dust Collector by Pangborn. Dust-laden air enters the bottom of the collector tangentially and heavy dust particles are immediately precipitated by centrifugal action. Patented vanes cause the air to ascend on a tortuous centrifugal path, exposing it to thorough cleansing by descending water, after which it discharges through the top. Unique Pangborn counter-current design results in greater efficiency of operation, reduced space for rated capacity, lower operation cost through reuse of water and capacity geared to individual needs.

Pangborn CONTROLS DUST

If *your* dust problem involves the control of dust difficult to handle with a dry collector, write for details on the new Pangborn Centrifugal Wet Collector! Send for Bulletin 919 to PANGBORN CORP., 3200 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control and Blast Cleaning Equipment.*

For more facts circle 534 on Reply Card

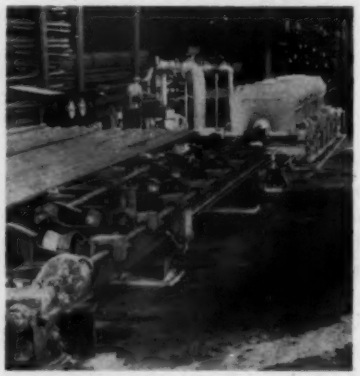
PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

Chalfant Division plant in Ambridge, Pa.

The equipment is used for continuous normalizing of small sizes of oil well tubing and includes three small furnaces, instrumentation for heat control by automatic regulation of valves in gas lines to burners, and automatic, variable-speed conveyors for handling the tubing between charging tables and cooling table. Approximately 1000 tons of tubing per month are normalized on a 20-turn per week schedule.

A feature of the design is the minimum use of high alloy steel in the conveyors. This was achieved by placing all conveyor rollers outside the three furnaces. Furnace conveyors consist of four water-cooled high-alloy rollers between and at the entrance and exit ends of the three furnaces. Inlet and outlet conveyor tables each have seven powered rollers.



Automatic heat treating line for oil well tubing requires only one operator

The normalizing line consists of three gas-fired furnaces, each four feet long and having four gas burners. The first two furnaces are used for heating the tubing and have burners of 1,000,000 Btu per hour capacity. They are automatically controlled at 2500 F to heat the pipe body to 1650 F and the upset to 1600 F. The third furnace is used for soaking and has four burners each of 750,000 Btu per hour capacity which are controlled at 1650 F.

Only two sizes of tubing are normalized in this line. One moves through the furnaces at about 10 ft per minute, while a speed range of 5 to 20 ft per minute, controlled by rheostat settings, provides for heat treating the other size.

The normalizing line operation is automatic except for keeping the charging table supplied with tubing by

Install Shatterproof, Light Diffusing

FILON®

Fiberglas and Nylon Reinforced

PLASTIC PANELS

Lasting low cost installation. FILON translucent panels nest with corrugated metal or asbestos. Easily installed, no costly framing.

Better skylights and sidelights. FILON transmits soft, diffused light. Assures greater comfort and employee efficiency.

Shatterproof windows. Flat FILON panels filter out harsh sun rays. Choice of colors for varying degrees of light transmission.

Fire retardant. FILON HETRON® panels for use in fire zones and types I, II, III and IV buildings. UL labeled with flame spread rating below 75.

Only **FILON's** electronically controlled process gives you uniformity of thickness and color, assuring greater strength and durability.

Free illustrated brochure containing ideas, installation drawings and technical data. Write to Sales Office nearest you or consult Yellow Pages under "Plastic Materials" for your local distributor.

FILON PLASTICS CORP.

The world's largest, most modern plant in its field

2051 East Maple Avenue, El Segundo, Calif.
270 Park Avenue, New York 17, New York
228 North LaSalle Street, Chicago 1, Illinois
55 Marietta Street, Atlanta 3, Georgia

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For more facts circle 535 on Reply Card

Very Few CONVEYING PROBLEMS are New to Us . . .

A typical system of Mathews gravity and power conveyers and special conveying machinery, designed to create a continuous flow of material in modern manufacturing plants in the United States and Canada.

Every day some manufacturer runs head-on into a conveying problem that's new to him . . . a handling job that he hasn't had to do before. It may be a package of unusual size or shape, or there may be unusual characteristics regarding space, temperature or weight.

Whatever the problem might be, chances are, we've done something like it, somewhere, sometime before.

That's where experience pays off, and you get the benefit of fifty years of it when you buy Mathews Conveyers.

50 YEARS OF MC MECHANIZED HANDLING

MATHEWS CONVEYER COMPANY

GENERAL OFFICES . . . ELLWOOD CITY, PENNSYLVANIA

PACIFIC COAST DIV., MATHEWS CONVEYER COMPANY WEST COAST, SAN CARLOS, CALIFORNIA

CANADIAN DIVISION . . . MATHEWS CONVEYER COMPANY, LTD. PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities.
Export Representative—Foreign Trade Division of New York Hanseatic Corp.

MATHEWS

For more facts circle 536 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

overhead cranes and similarly removing the tubing that accumulates on the cooling table. On the charging table, the tubing rolls by gravity to a stop where automatic air-operated selective kick-in arms pick up a length of tubing and roll it onto the furnace inlet table. The tubing is conveyed through the furnaces by the four rolls at the ends of the furnaces, then to a conveyor. There is an automatic kick-out paddle switch at the end of the outlet conveyor. When depressed by a length of tubing the air-operated kick-out arms discharge the length onto the cooling table. *From a release of The National Supply Co., Pittsburgh, Pa.*

Ghost Motor

A motor which does not run, but which behaves like a real motor in operation, has been designed to test switches and relays. A "ghost" motor was necessary because real motors wore out faster than the equipment being tested on them.

The "ghost" motor can not wear out because it has no moving parts. Instead, resistors and inductors duplicate the electrical behavior of an ordinary motor. It is installed in a full size, fully finished, unoccupied bungalow on the roof of the company plant used solely for conducting engineering tests. *From a release of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.*

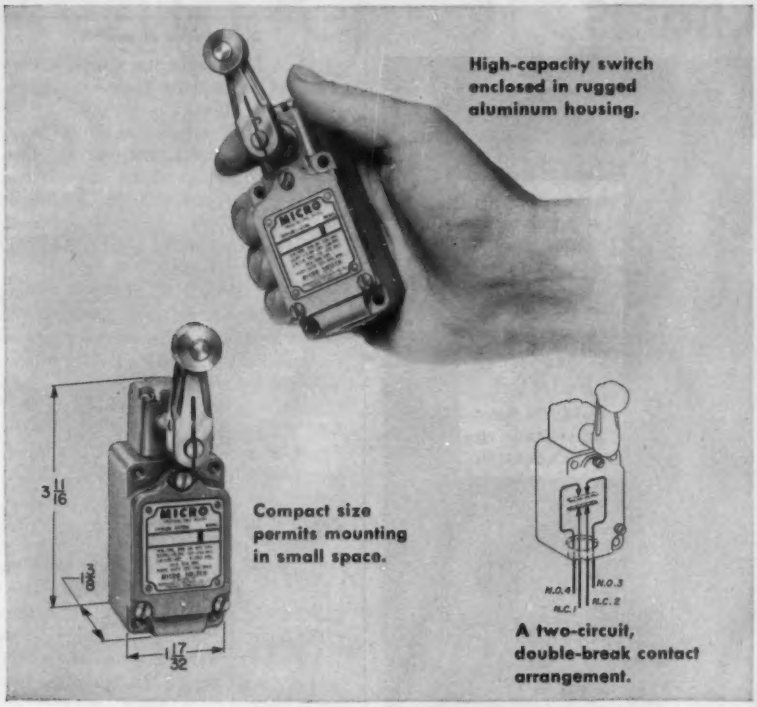
Standard Lathe Holds Tolerances

TOLERANCES of 0.0005 in. on stainless steel, Monel brass, bronze, copper and silver bellows connectors and fittings are being machined on a standard, 11-in. metal-working lathe at the

Standard lathe holds close tolerances on parts machined of stainless, Monel

MICRO *precision switches*

...THEIR USE IS A PRINCIPLE OF GOOD DESIGN



Here is a compact 2-circuit limit switch that meets a wide variety of plant applications

This MICRO precision switch is designed to meet every requirement for a compact 2-circuit switch for use as a limit, safety or interlock switch on complex production equipment.

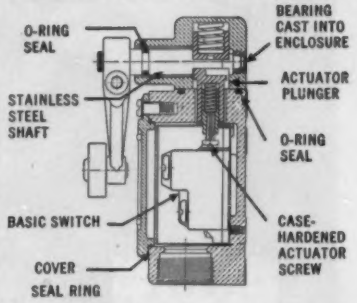
It has small size, extreme versatility, precision, reliability and ruggedness. All moving parts and the switching chamber are completely sealed, protected from wear or becoming fouled. Field adjustability permits its use in any type of application or location

Two-circuit contact arrangement allows flexibility in circuit design. Reliability of the precision, snap-action unit assures accurate repeat operation throughout many millions of hard, fast actuations. Although small and compact in size, this switch is not only a precision instrument. It is designed and built to stand the most severe abuse.

The electrical rating is: 10 amperes 120, 240 or 480 volts a-c; ½ H.P. 115 volts a-c; 1 H.P. 230 volts a-c; .2 ampere 115 volts d-c; .1 ampere 230 volts d-c; .04 ampere 550 volts d-c. Pilot duty rating is: 600 volts a-c, max.

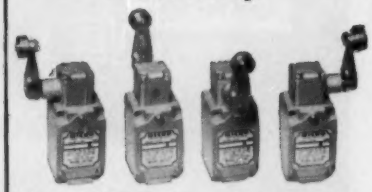
Like many other precision switches in the MICRO SWITCH line, this versatile 2-circuit switch is an ideal component for installation on present plant equipment. MICRO precision switches make production machinery safer, more automatic and more productive.

Seals Provide Maximum Protection



Sealing is provided by use of O-ring seals on the actuator shaft and between the actuator head and the housing. A synthetic rubber ring seal is provided for the cover. These seals provide maximum protection against entrance of dust, oil and other liquids. The switch meets NEMA specifications for an oil-tight pilot device.

Adjustable Head Assembly



The switch is easily mounted in almost any location. The user can remove the head and locate it in any of 4 positions (as illustrated).

Field Adjustable Actuator

The roller arm actuator is field adjustable through 360 degrees, positively locking in any position. Actuators are assembled to operate in either direction. They can also be converted to operate in one direction only, clockwise or counterclockwise

Send for new catalog 83 on industrial enclosed switches.

MICRO precision switches are sold by distributors in key cities everywhere. Look under "Switches, Electric" in the yellow pages of your phone book.

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

For more facts circle 537 on Reply Card

ACCO Registered* Sling Chains

an ACCO product

NEW!
Shaped Section Master Link
Holds its form under loads up to 18% greater.
NEW!
Accoloy X-Weld 125 Chain
Welds as strong or stronger than alloy material. Welded area 2¼ times conventional size area.

* Trade Mark Registered

NOW—Better and Safer than Ever!

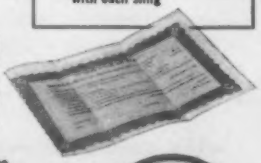
● ACCO *Registered* Chain Slings—long recognized as the standard of excellence—now give users a double bonus of safety and quality. They incorporate ACCO's new Shaped Section Master Link plus ACCO's sensational Accoloy X-Weld 125 chain.

The new Shaped Section Master Link, without any increase in weight, withstands deformation under loads up to 18% greater than a standard round section can. And the Accoloy X-Weld 125 chain—with its extra-strong, king-size welded area and its non-kinking feature—assures extra ruggedness and better service.

Because of these two spectacular improvements, there is more reason than ever for standardizing on ACCO *Registered* Slings. For additional interesting information, call your ACCO *Registered* Distributor—or write our nearest District Office.

WHAT "ACCO REGISTERED" MEANS . . .

1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring on each sling
6. Signed Registry Certificate with each sling



ACCO

American Chain Division
AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

plus Rings Links Hooks

For more facts circle 538 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

Clifford Manufacturing Corp., a division of Standard-Thomson Corp., Waltham, Mass.

Other jobs assigned to the lathe are the machining of Monel pins, 0.375 in. long and 0.064 in. diam. A tolerance of 0.0595 in. to 0.0600 in. is held on these pins. Cuts of 0.002 in. are made in the pins, both ends of which are chamfered and deburred.

Tool steel and drill rod trimming arbors with tolerances of plus or minus 0.0005 in. have also been machined on the lathe, and on bellows flanges having 2.50-in. OD and 1.01-in. ID, surfaces of 80-20 brass circle blanks were held flat and parallel within 2 deg. *From a release of Rockwell Manufacturing Co., Pittsburgh, Pa.*

Profitable Salvage Program

SALE OF salvage materials from the plant during the past 12 months totaled $1,070,145, more than half of which came from the sale of aluminum scrap.

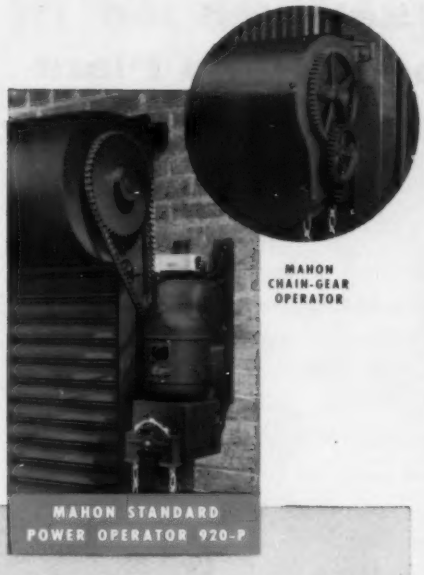
To realize a high return from the sale of scrap, metals are classified into types, including titanium, magnesium, copper and stainless steel; wood, cardboard and other trash is sorted.

Trash and floor sweepings are raked over a grid in the salvage yard. Metal items pass over a magnetic wheel which extracts steel parts, while aluminum and other small, non-magnetic items are shaken from a vibrator. Larger metallic parts are sorted into piles according to the type of metal. Small hardware items including rivets, bolts, nuts and fasteners are separated by hand. *From a release of Convair, Div. of General Dynamics Corp., San Diego, Calif.*

Floor sweepings are sifted in vibrating machine for rivets, small screws, bolts

Rolling Steel Doors

Manually, Mechanically, or Electrically Operated



MAHON CHAIN-GEAR OPERATOR

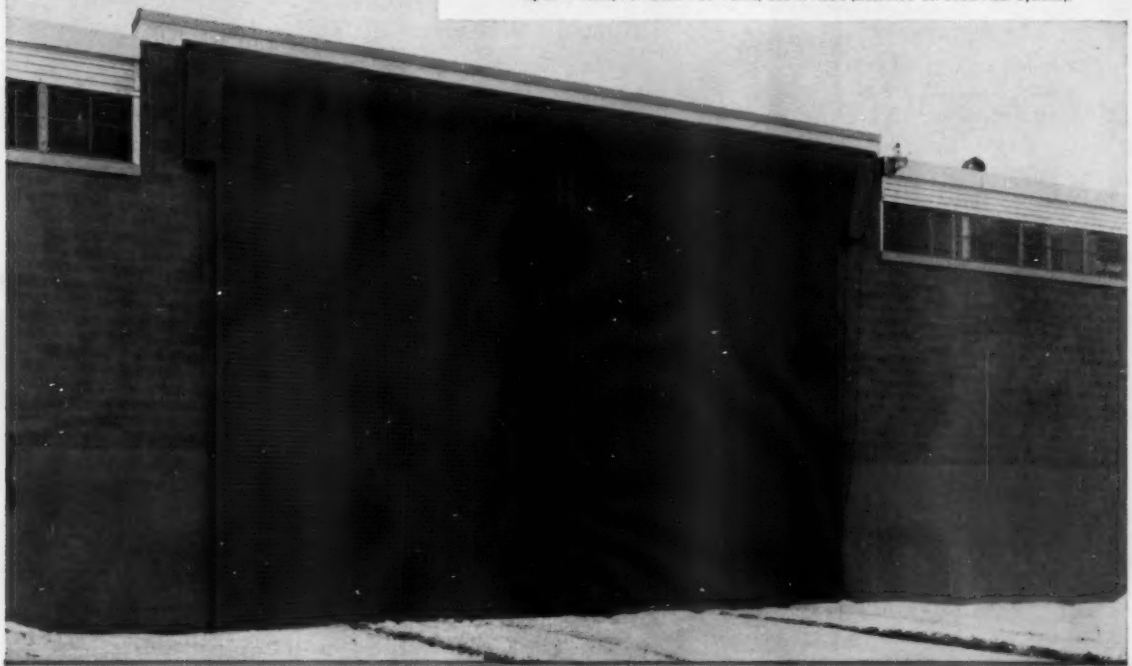
MAHON STANDARD POWER OPERATOR 920-P

When you consider doors—either for new buildings or for replacement in old buildings—you will be most impressed with the numerous advantages of Rolling Steel Doors. No other type of door offers the important space-saving and time-saving advantages in every day operation . . . and no other type of door offers the positive protection against intrusion and fire. The vertical roll-up action of the rolling steel door occupies no usable space either inside or outside the door opening. There are no overhead tracks or other obstructions to interfere with crane handling adjacent to door openings—the door curtain is compactly rolled up flush with the lintel and safe from any possibility of damage while the door is open. Quick-opening, quick-closing Mahon Power Operated Rolling Steel Doors, with signal arrangements and remote push-button control stations, offer the ultimate in convenience and timesaving operation—particularly in shipping and transfer docks where a number of doors are involved. Rolling Steel Doors will serve you better in any type of opening . . ; their all-metal construction gives you the permanence which assures a lifetime of trouble-free service. However, before you select a Rolling Steel Door, check Specifications carefully . . . you'll find extra-value features in Mahon doors—for instance, the galvanized material in the curtain slats is BONDERIZED and DIP-COATED with synthetic enamel which is baked on at 350° prior to roll-forming. You will find many other quality and design features in Mahon Rolling Steel Doors that add up to a greater over-all value. See Sweet's Files for information including Specifications, or write for Catalog G-56.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York and Chicago • Representatives in Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Closing Underwriters' Labeled Rolling Steel Fire Doors and Fire Shutters; Insulated Metal Walls and Wall Panels; Steel Roof Decks and Long Span M-Decks; Permanent Floor Forms; and M-Floors (Electrified Cel-Beam Floor Systems).



ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Two Mahon Power Operated Rolling Steel Doors 16'-0" x 22'-4" installed in a double truck opening in Sutherland Paper Company's plant, Kalamazoo, Mich. Thirty-seven other Mahon Rolling Steel Doors are installed in various types of openings in this modern plant.

MAHON

For more facts circle 539 on Reply Card

WATERSPHERE

Selected for MoPar Parts Plant

200,000-gallon Watersphere at Chrysler Corporation MoPar plant Centerline, Michigan

● The Chrysler Corporation recently installed a 200,000-gallon Horton Watersphere® and two 150,000-gallon Horton suction tanks at their MoPar parts plant in Centerline, Michigan. The Watersphere provides a dependable gravity water pressure for general service and fire protection. The suction tanks are connected, through a fire pump, to an automatic sprinkler system and provide the secondary water supply.

● Is your plant protected from the ravages of fire? If not, it should be! Write our nearest office for estimates or quotations on a Horton elevated tank, Watersphere or suction tank.

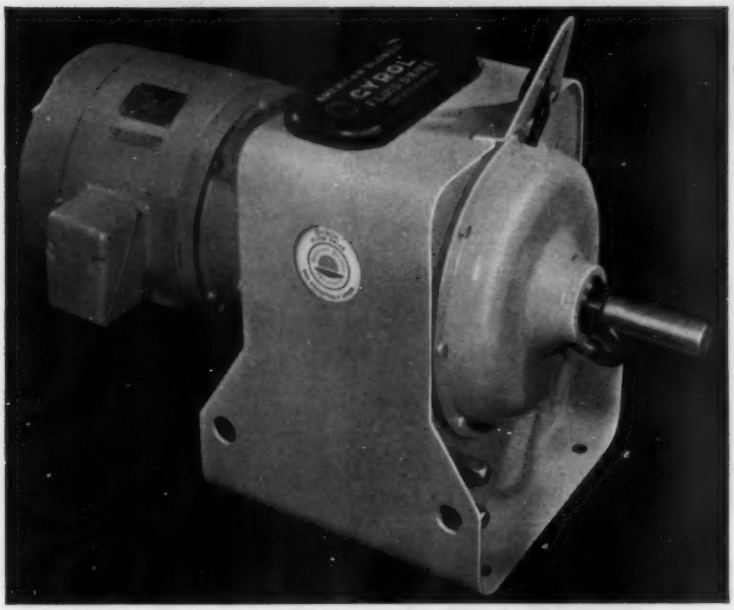
CBI

Chicago Bridge & Iron Company

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston
Los Angeles • New York • Philadelphia • Pittsburgh • Salt Lake City
San Francisco • Seattle • Tulsa • Washington

Plants in
BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

Just out—new, smaller sizes in Class 2 Gýrol Fluid Drives!



Type VS, Class 2 Gýrol Fluid Drive for 1- to 800-hp applications.

With the addition of new sizes in the lower horsepower range, you now have a *complete line* of Type VS, Class 2 Gýrol Fluid Drives from which to select – 1 hp to 800 hp, speeds to 3600 rpm!

These compact, self-contained units offer unlimited application possibilities, because of their important benefits: adjustable, stepless speed control; reversible while in motion; 5 to 1 speed range; no-load starting; complete shock absorption; remote, manual, or automatic control; quiet operation.

For full information on the complete Type VS, Class 2 Gýrol Fluid Drive line, contact our nearest branch office. There is one in every principal city.

Typical Applications:

PUMPS, AGITATORS, MIXERS

CONVEYORS, CABLE & ROPE MACHINERY

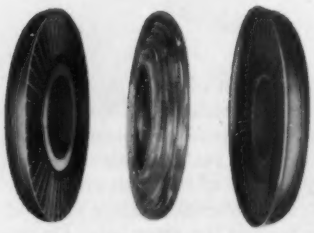
FANS AND BLOWERS

CENTRIFUGAL COMPRESSORS

PAPER AND PRINTING MACHINERY

TEXTILE MACHINERY

Simple design, flexible operation



Runner Vortex of Oil Impeller

Gýrol Fluid Drive provides a simplicity of design and a flexibility of operation no other method of power transmission offers – plus an inherent safety factor. Operates on hydro-kinetic principle, using vortex of oil to transmit power from driving to driven machinery. Power is transmitted smoothly, evenly, efficiently, without shock.

American Blower products serve industry

- Air Conditioning, Heating, Ventilating Equipment
- Mechanical Draft Equipment
- Industrial Fans and Blowers
- Centrifugal Compressors
- Gýrol Fluid Drives
- Dust Collectors
- Refrigerating Machines

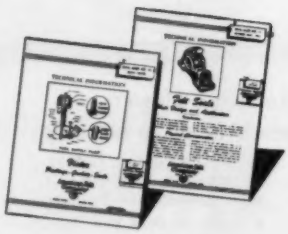
AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American-Standard

AMERICAN 75th ANNIVERSARY YEAR 1881 - 1956 **BLOWER**

For more facts circle 541 on Reply Card

The seals shown here are a combination of felt for shaft lubrication, plus spring-loaded leather or rubber for exclusion of water, fumes, dust. Such seals are made by a number of companies, in standard and special diameters. List of firms on request. Felt seals can also be made impervious by metal enclosures, or by the use of felt with one or more laminations of synthetic rubber. Just remember that felt is so versatile that it can either lubricate or seal, or both at the same time. On request we will collaborate on designs and specifications. Write for Data Sheet No. 11, "Felt Seals, Their Design and Application," and for No. 14, "Vistex, Packings, Gaskets, Seals."



American Felt Company
TRADE MARK ®

GENERAL OFFICES: 80 GLENVILLE ROAD, GLENVILLE, CONN.
SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Greenville, S. C., Dallas, San Francisco, Los Angeles, Portland, Seattle, Montreal.—PLANTS: Glenville, Conn.; Franklin, Mass.; Newburgh, N. Y.; Detroit, Mich.; Westerly, R. I.—ENGINEERING AND RESEARCH LABORATORIES: Glenville, Conn.

For more facts circle 542 on Reply Card

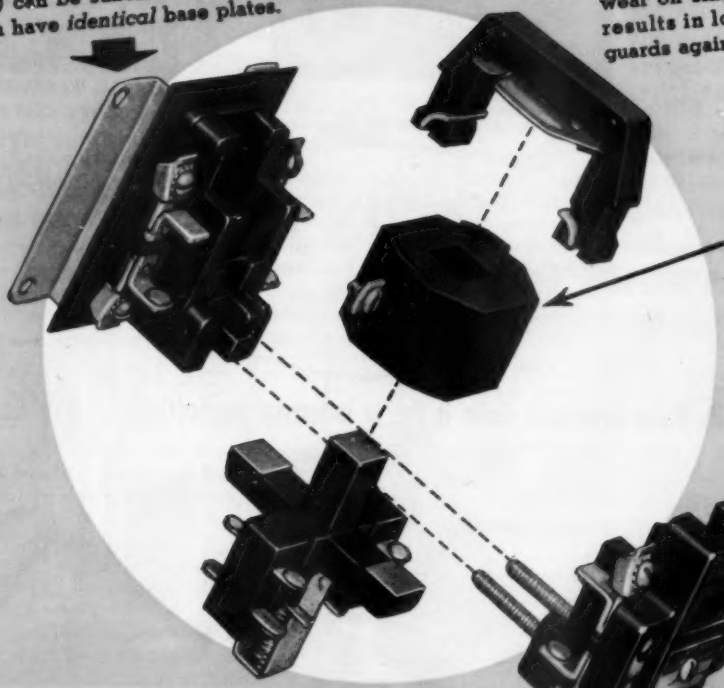
FREE! Write for Data Sheets Nos. 11 and 14.

For more facts circle 543 on Reply Card——→

this new, small size SQUARE D RELAY has features you'll like!

NO MOUNTING WORRIES
When more contacts are required, the 4-pole relay (DO-42) can be substituted for the 2-pole (DO-22). Both have *identical* base plates.

OUTSTANDING PERFORMANCE
Balanced construction reduces wear on single moving part... results in long life and safeguards against down time.



RESISTS DAMAGE
Plastic impregnated molded coil is unbreakable, operates cooler, is dimensionally stable and impenetrable by water and oil.

20-SECOND DISASSEMBLY
Simply loosen two screws and the entire device is disassembled for normal maintenance.

This new Class 8501 Type D relay is amazingly compact. 2-pole version measures only 3 3/16" high x 2 3/8" wide! 4-pole is only 3 1/16" high x 2 13/16" wide! Both rated 10 amperes, 600 volts. Packaged parts kits make normal maintenance easier than ever. Write for Bulletin 8501 which tells the complete story. Address Square D Company, 4041 North Richards Street, Milwaukee 12, Wisconsin.

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

OPERATION AND PRODUCTION pointers for the industrial plant engineer

Edited by H. E. B. Anderson

PVC Pipe Solves Plating Problems

UNPLASTICIZED polyvinyl chloride piping systems form an important part of the new $50,000 chromic acid recovery and solution purification facilities at the Perfect Circle Corporation's plant in Hagerstown, Md. There are five applications of PVC piping in the plant.

In the first application, 1¼-in. and 1½-in. lines are used on the deionizer which supplies pure water to the process. Second, 2-in. lines serve a 1500-gal dilution tank where chromic acid is handled in concentrations of 10-40 per cent.

In the third application, lines ranging from 1 in. through 2 in. serve a 1500-gal adapter tank where water containing a 1 per cent concentration of chromic acid is processed. In the fourth, 2-in. lines connect to a 350-gal sulfuric acid regenerant sump tank, and in the fifth, a 2½-in. line drains regeneration wastes.

Operating pressures range between 25 and 75 psi, and temperatures from 50 to 90 F.

Plating engineer, C. L. Gough, lists these advantages provided by PVC piping: Absence of scale, found in metal and alloy lines, protects the acid and make-up water against discoloration and contamination; corrosion leakage hazards to personnel have been avoided; the piping shows no signs of deterioration; PVC piping requires no paint; it is easy to install, and can as easily be disassembled; it has excellent electrical and insulating properties and is non-aging and its cost is much less than piping generally employed in chrome plating services.

Piping system of 2-in. PVC piping line serves chromic acid dilution tank

The piping was fabricated with injection molded fittings, made by Tube Turns, Inc., Louisville, Ky.

Submerged Pumps Tame Hot Well

INSTALLATION of submerged vertical centrifugal pumps in a condensate return operation has improved the efficiency of the steam heating system at Morgan Engineering Co., Alliance, Ohio, according to plant spokesmen.

Pumps installed ten years ago in the condensate tank were difficult to maintain because the hot condensate prevented proper lubrication of the bronze impeller bearings submerged in the six 4-ft deep "hot wells." As a result, the bearings and impellers wore rapidly.

Normal operation of the system, in cold weather, called for operation of the pumps for about one minute every five minutes. It was found, however, that the level of the water in the con-

(Continued on page 54)

Disposable Curtain Picks Up Paint Overspray, Rolls It Up, in Industrial Application

INTRODUCTION of a readily disposable rear "wall" for its paint spray booth has improved the operations at the Michigan Crane & Conveyor Co., Detroit. According to a company spokesman, replacement of their baffled rear wall in the spray booth with a rolled curtain wall has decreased paint loss through the exhaust stack and has greatly reduced the need for cleaning the booth at frequent intervals.

Fig. 1. Dispo spray booth, with disposable curtain in rear, as used in plant

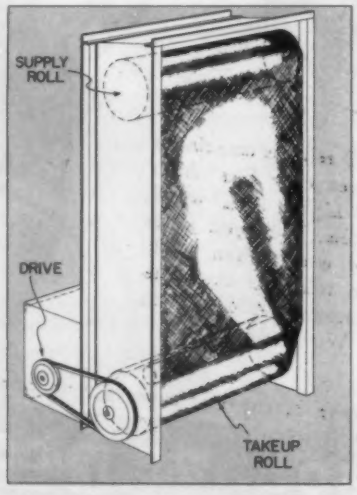


Fig. 2. Sketch of the "working parts" of the booth. Motor drives take-up roll

A Dispo paint spray booth, the "working" portion containing two reels and a motor drive for the lower reel, was installed in the finishing area of the plant. Five feet in width, the curtain can be rolled up as it becomes saturated with paint overspray. The operator depresses a control button mounted on the exterior of the booth, to start the motor drive on the takeup reel. Another button, immediately adjacent to that controlling the curtain will stop and start the fan in the exhaust system of the booth.

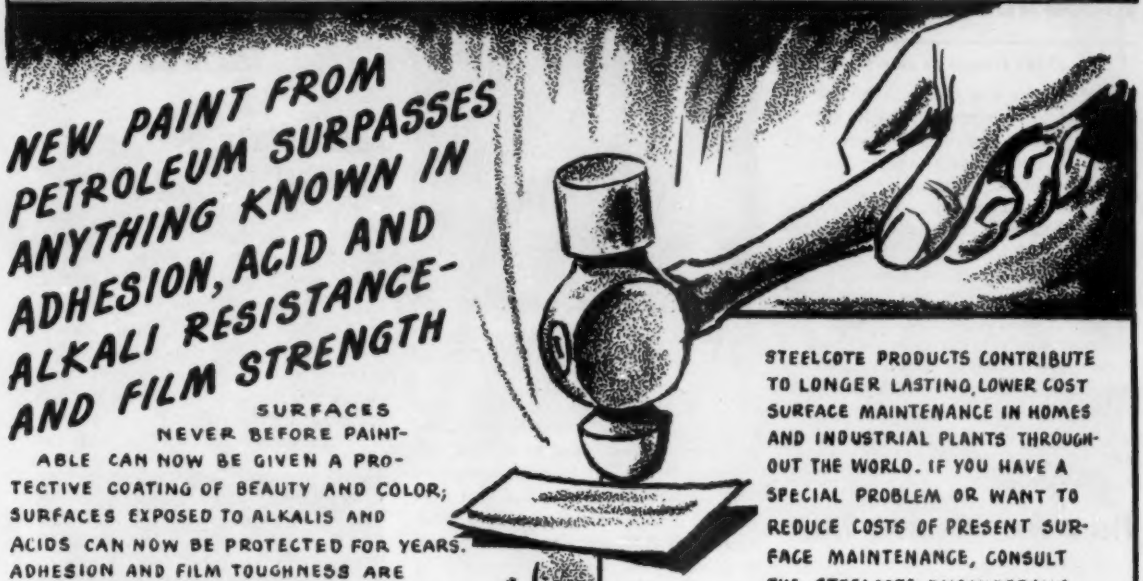
Because the paint spraying is not a continuous operation, the curtain often remains in one position for a full shift, without becoming saturated to the point where it will not readily pass exhaust air.

This economy of operation, together with the fact that the booth no longer need be cleaned (and the baffles scraped) makes the Dispo installation a time and cost saver for user.

BELIEVE IT OR NOTS IN INDUSTRIAL COATINGS

NEW PAINT FROM PETROLEUM SURPASSES ANYTHING KNOWN IN ADHESION, ACID AND ALKALI RESISTANCE- AND FILM STRENGTH

SURFACES NEVER BEFORE PAINTABLE CAN NOW BE GIVEN A PROTECTIVE COATING OF BEAUTY AND COLOR; SURFACES EXPOSED TO ALKALIS AND ACIDS CAN NOW BE PROTECTED FOR YEARS. ADHESION AND FILM TOUGHNESS ARE SO GREAT YOU MUST SEE TO BELIEVE. NAME OF THE NEW PRODUCT IS EPO-LUX



STEELCOTE PRODUCTS CONTRIBUTE TO LONGER LASTING, LOWER COST SURFACE MAINTENANCE IN HOMES AND INDUSTRIAL PLANTS THROUGHOUT THE WORLD. IF YOU HAVE A SPECIAL PROBLEM OR WANT TO REDUCE COSTS OF PRESENT SURFACE MAINTENANCE, CONSULT THE STEELCOTE ENGINEERING DEPARTMENT.

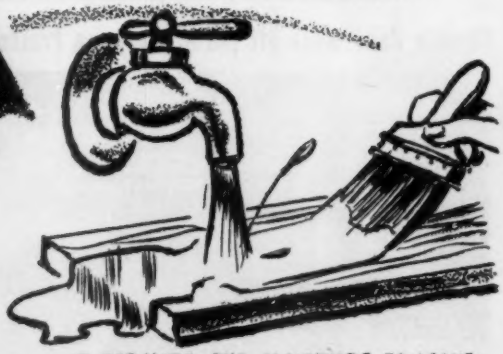
NEW FLOOR ENAMEL CAN BE WALKED ON IN 30 MINUTES

OFFICES, SHOWROOMS, CORRIDORS, STEPS, AND MACHINERY CAN BE GIVEN LIKE-NEW LOOKS AND EVERYTHING IS DRY IN 30 MINUTES. THE SAVINGS IN TIME ALONE MAKES LONG LASTING, TOUGH FILM QUICK-X THE MOST ECONOMICAL FLOOR FINISH ENAMEL ON THE AMERICAN MARKET

NO NEED TO REMOVE RUST TO PAINT

HALTS-RUST GOES RIGHT OVER RUST, A FILM OF OIL SURROUNDS EACH RUST PARTICLE, KEEPS IT NEUTRALIZED WHILE SURFACE OF HALTS-RUST HARDENS INTO A BEAUTIFUL ENAMEL FINISH.

PAINT GOES ON WET SURFACES



IT, PERMITS THE MOISTURE TO LEAVE- THEN IT DRIES INTO A HARD, PORCELAIN-LIKE FILM, SEALING OUT MOISTURE THEREAFTER. FOR COOLER, FOOD AND DRINK PROCESSING ROOMS. THE NAME IS DAMP-TEX.

There Are More Than 100 Products Made By

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For more facts circle 544 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

densate tanks was being disturbed by steam entering the tank, to the extent that the pump control floats were bobbing up and down, causing erratic operation of the pumps.

Replacement pumps, manufactured by the Deming Co., Salem, Ohio, were installed with babbitt graphite bearings in the lower impeller housing. No lubrication, other than the water itself, is required for the bearings. Electrode rod type controls, using the condensate itself as a conductor, have smoothed out the on-off cycle of the pumps.

With one-third less horsepower required for the new pumps, savings on electric power costs are considered significant.

Plastic Sheet Waterproofs Tank

WATER SEEPAGE of two to three gal per minute has been almost eliminated by lining a 5000-gal concrete diesel-electric plant cooling tank with plastic sheeting.

The tank, 21 ft long, 6 ft wide and about 6 ft high, was built 30 years ago as part of the foundation of the Logan City Diesel plant, Logan, Utah. In it, hot water from the diesel engines is mixed with cold water, then returned to cool the engines. The sharp difference in temperature inside and outside the tank caused severe

Supported by redwood strips around top of tank, plastic waterproofs walls

cracking in the walls and floor; water seeping from the tank widened the cracks and contributed to uneven settling of the tank and plant foundation. The seepage became so bad that during the nightly shutdown from midnight to 6 AM, the water level would drop to a point where the circulating pumps lost their suction.

A costly remedy—grinding the cracks into v-shaped troughs and filling them with water-resistant material—reduced the water level drop to several feet during the six-hour period.

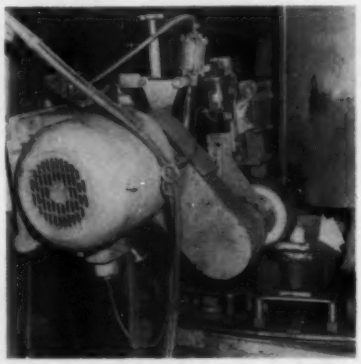
Then, a lining of Krene plastic sheeting, made by the Bakelite Co., Division of Union Carbide & Carbon Corp., was fabricated to fit the inside of the tank. Only 0.020 in. thick, the lining was suspended by redwood strips bolted to the top of the tank walls. Flanges were placed around pipes projecting into the tank to form a tight seal with the lining.

Since the lining was installed, the water level drops an average of only one-half inch from midnight to 6 AM. This minor leakage is attributed to valves and pipes of the tank outlet system.

Automatic Buffer Uses "Cool" Buffs

ELECTRIC SAW housings pass under a buff in an automatic operation at Black & Decker Mfg. Co., Towson, Md., manufacturer of portable electric tools. Because of the many projections on the housing, it is necessary to reposition it several times during the process, so that wheels set at different angles and positions can hit the various surfaces of the part.

A spring-balanced spindle holds the



One position of buffing machine, shows the wheel buffing casting (arrow)

buffing wheel, permitting it to ride the casting passing under it. A ratchet mechanism above the buff automatically feeds buffing composition to the wheel.

Specially-designed, the automatic machine passes the casting, on a turntable, under a series of buffing wheels which are made up of sections of ventilated buff. Supplied by Hanson-Van Winkle-Munning Co., the wheels, called Ruff-L-Buffs, are constructed to provide circulation of air through the buff as it turns, dissipating heat rapidly.

Flexible Rails Move Off the Highways to Protect Industrial Equipment

Photo: Armco Drainage & Metal Products, Inc.

Mounted on pipe columns, guard rails protect electrical control panels from accidental damage by sheet metal parts being processed in machine at right

Drill Press Foot Guard

Contributed by R. E. Franklin

ON FLOOR-MOUNTED drill presses, the table is adjusted vertically on the pedestal by releasing the clamp and manipulating it by hand. A normal movement of the operator when adjusting the table is to place one foot

(Continued on page 56)

A GOOD MAN TO KNOW FOR INDUSTRIAL LUBRICATION

No service is better than the men behind it. That's why Atlantic lubrication consultants, such as the man you see in the illustration, are experienced men with years of on-the-job knowledge of heavy industrial lubrication requirements.

These men are also representative of the men behind the service you can expect from Atlantic. Atlantic is made up of many specialists — men skilled in research, production, transportation and marketing of petroleum products from lubricants and gasolines to petrochemicals.

Behind their skills are 85 years of developing successful products for the use of our customers. Atlantic has pioneered in many historic firsts in the petroleum industry. To judge for yourself the value of Atlantic service, write, wire or phone the Atlantic office nearest you for full information on Atlantic lubricants for heavy industrial installation. The Atlantic Refining Company, Dept. M-5, 260 South Broad Street, Philadelphia 1, Pa.

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IT PUTS THE
SQUEEZE
ON PUMPING
COSTS
MOTOR PUMP

When you compare the Motorpump with any other pump . . . feature by feature . . . size by size . . . you'll quickly see why it is out in front for all liquid handling applications.

Installing it gives you *proof*. For one thing, you'll generally find you can use a *smaller* Motorpump to do the work assigned to pumps of larger horsepower. So costs are lower.

- Moreover, Motorpumps are so compact and efficiently designed that you save space and reduce power consumption. Installation is also simplified because they can be mounted in *any* position – on floor, wall or equipment–with no foundation needed!

Get to know the I-R Motorpump line–ranging in size from ¼ to 75 hp, 5 to 2800 gpm with heads to 650 feet.

Send for latest bulletin giving full data needed to choose a Motorpump.

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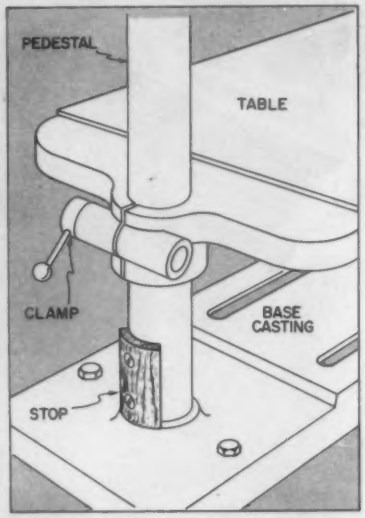
OPERATION—PRODUCTION

(O and P begins on page 52)

on the base casting of the machine. Some foot accidents have occurred when the table slipped out of the worker's grasp and slid down the column to hit his foot.

The danger can be overcome by fitting a hardwood stop to the pedestal. It stops the falling table 6 in. or more



Secured at the foot of the drill press pedestal, wood block stops table fall

above the machine base, and prevents foot injuries.

The stop is a piece of wood, turned to fit on the cylindrical column, and secured to it by self-tapping screws.

Makeshift stops have been made by simply placing two lengths of hardwood dowel in position at the foot of the column, securing them with fabric-backed adhesive tape. These are prone to loosening, however, and the more permanent stop is preferred.

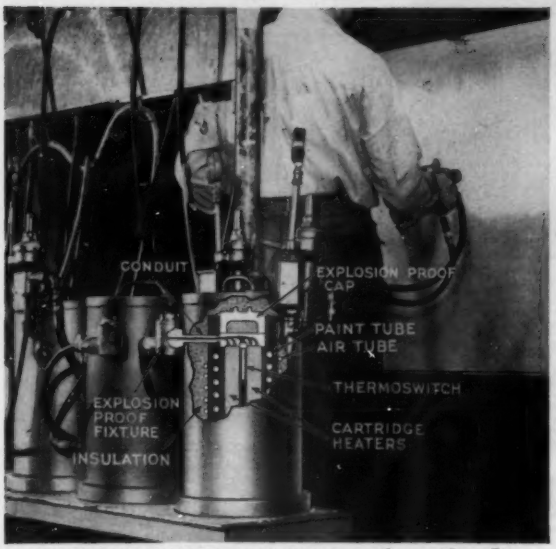
Jig Improves Tubing Butt-Welds

Contributed by F. E. Riley

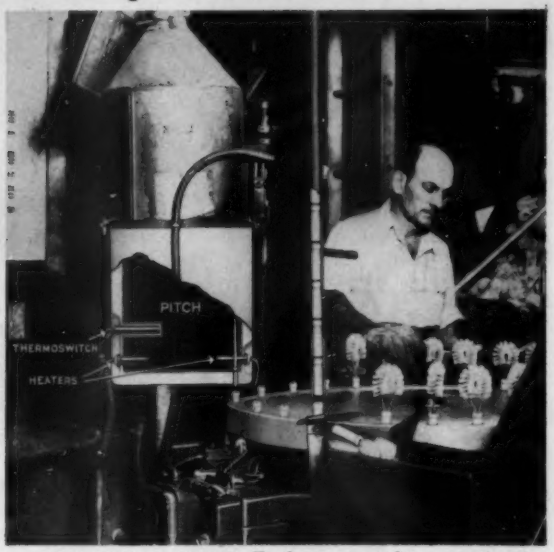
WHEN BUTT-WELDING tubes, a main requirement is that the tube ends be held in alignment with one another while the welding is completed.

A simple holding jig to accomplish this can be made from a length of angle iron, by cutting an opening in the angle iron, as shown in the drawing, and welding two bridge pieces to the inside of the angle. The bridge pieces are drilled and tapped to receive clamping screws. The screws may be hex head bolts, knurled thumb screws or T-head screws; the choice is de-

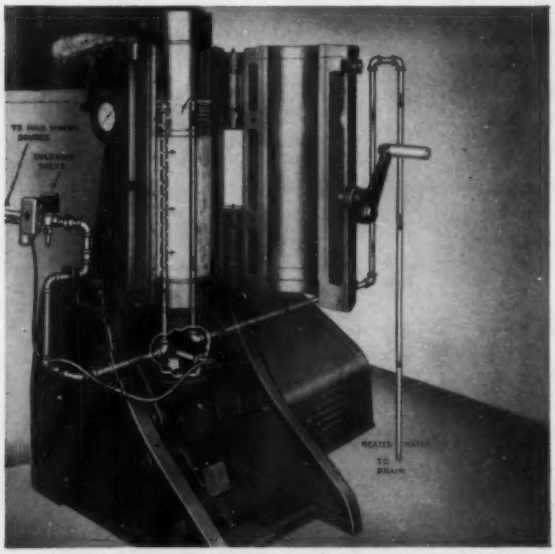
How would you solve these tricky temperature control problems?



1. KEEPING A PAINT HEATER EFFICIENT was the problem. It was solved with the help of a Fenwal heavy duty block THERMOSWITCH® unit. Heat from a 2000-watt source is accurately held at 150F — for top efficiency. Users just plug it in, forget it. THERMOSWITCH unit is attached to explosion-proof block, as shown in diagram.



2. PROTECTING MACHINERY. Engineers wanted to prevent motor damage to automatic brush assembly equipment by starting the operation shortly *before* the sealing compound (pitch) reached the liquid stage. Upon Fenwal advice an inverse type THERMOSWITCH unit was installed to close circuit when pitch temperature reaches 180 F. Circuit opens *only should* pitch heaters fail.



3. COOLING PRINTING PLATES. If printing plates cool too fast, they shrink — if too slow, they become porous. Reject plates were practically eliminated when a solenoid water valve was substituted for a hand valve — with a Fenwal THERMOSWITCH unit guarding the water temperature closely and operating the valve whenever the set point was passed. THERMOSWITCH shell itself "senses" change.

4. FREE CATALOG brings you complete data on the unique THERMOSWITCH unit. More details on problems discussed here if you want them. Fenwal engineers are always glad to help on special temperature control problems involving heat, humidity, pressure and other variables. Write **Fenwal Incorporated, 395 Pleasant St., Ashland, Mass.**

Fenwal **THERMOSWITCH®**

Controls Temperature — Precisely

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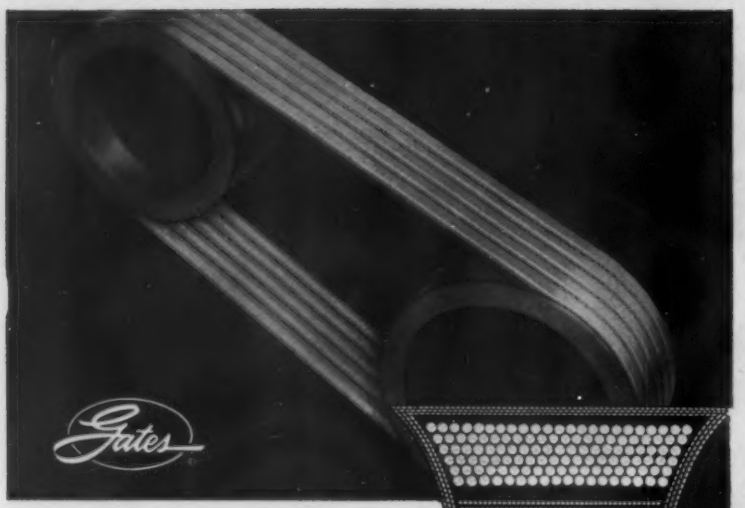

Concave sides make V-belts last longer

The sides of every Gates V-belt (Fig. 1) are concave—a precisely engineered curve that greatly increases V-belt life. Here's why:

On the bend around the sheave, the concave sides of a Gates V-belt fill out and become straight (Fig. 1-A). Thus the belt makes full contact with the sides of the sheave, grips the sheave evenly, and wear is distributed evenly across the sides of the belt. Uniform wear lengthens belt life; keeps costs down.

Make this simple test

Take a straight-sided belt (Fig. 2) and bend it. Feel the sides at the bend; they bulge out. Now picture this bulge in the sheave groove (Fig. 2-A). It is easy to see that the belt makes uneven contact at points indicated by arrows. Naturally, wear is greater at these points. Uneven wear shortens belt life; increases belt costs.

Cut down-time and V-belt replacement costs. Specify belts that grip evenly and wear longer . . . specify Gates Vulco Rope—the V-belt with concave sides. There is a Gates distributor nearby who will quickly supply the belts you need. The Gates Rubber Co., Denver, Colorado

—World's Largest Maker of V-Belts

TPA 68

Gates VULCO ROPE Drives

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OPERATION—PRODUCTION

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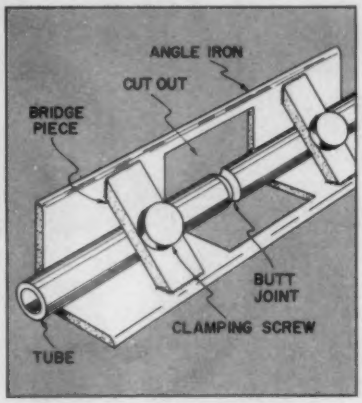


Tubing positioned in welding jig. Cut-out provides access for welding torch

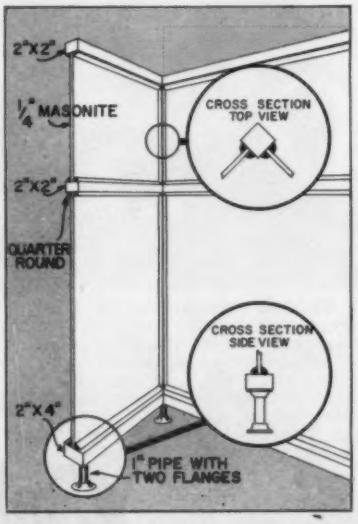
pendent on the weight of tubing being welded and the clamping pressure to be used.

For welding, the tubing ends are centered in the V of the angle iron, and are clamped firmly in place with the screws. About half the periphery of the joint can be reached by the torch or arc, with the jig in one position. To cover the other half, the jig is simply turned over.

Partitions Stand on Their Own

Contributed by George Weisenbach The Buchen Company

TEMPORARY OR PERMANENT, as their use dictates, partitions made of Masonite and basic millwork sizes of lumber



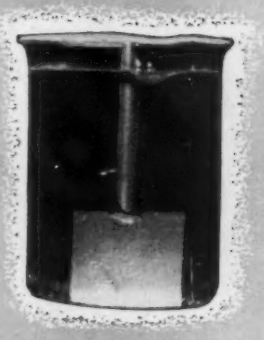
Sketch of partition shows components needed. Insets show construction details

A New, Better Coagulant

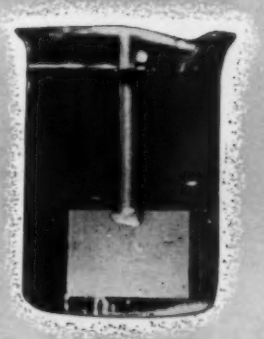
NALCO 600

POLYELECTROLYTE

Alum



Alum plus
typical polyelectrolyte



Alum plus
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Extremely difficult coagulation conditions provide especially economical applications for Nalco 600. It can be used alone or in conjunction with other coagulants. A very low dosage of Nalco 600 usually permits as much as 50% reduction in dosage of alum, activated silica, iron sulfate or clay type treatments . . . and results in a cleaner, clearer supernatant liquid.

Nalco 600 was invented in the Nalco Laboratories, and is being manufactured *only* by Nalco. For complete data on Nalco 600, and expert technical assistance to solve your clarification and coagulation problems, call Nalco now.

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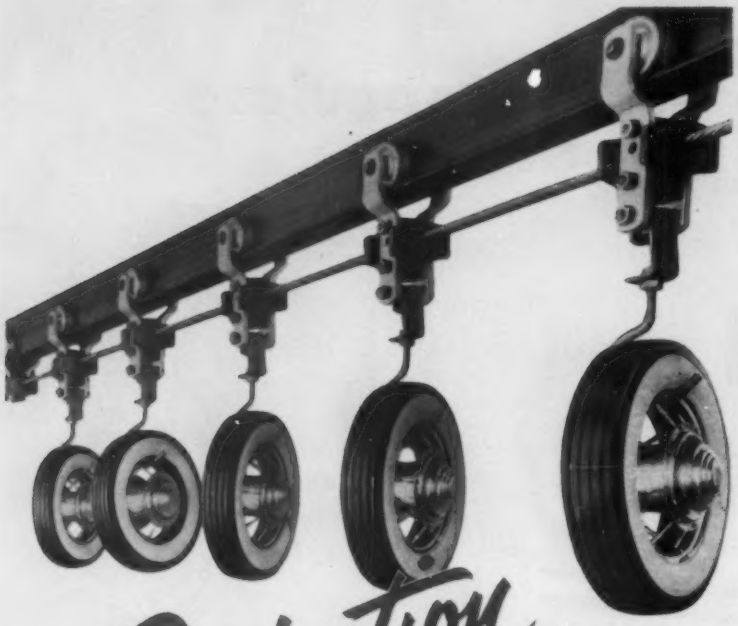

Production going your way on Buschman Cable Conveyors

These streamlined pre-engineered conveyors have no equal in economy, flexibility and application. Designed for light and medium loads, they will operate continuously with minimum adjustment and maintenance.

Fabricated from stocked component parts, Buschman "Universal" cable conveyors permit "customized" installations at standard prices. Their compact construction . . . shorter radius turns and dips . . . save production space.

If low-cost production is your goal . . . Buschman is your conveyor! The E. W. Buschman Co., 4426 Clifton Avenue, Cincinnati 32, Ohio.

Space saving construction shown by 9-1/2" radius dip at tank.

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World's Most Complete Line of Conveying Equipment

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GRAVITY CONVEYORS • LIVE ROLLER • BELT • SLAT • ETC.

Write for Bulletin 40 for complete details.

For more facts circle 550 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

are easily constructed for plant use.

Pipe nipples, fitted with flanges at each end, serve as supports to raise the panels off the floor, thus facilitating cleaning of the floor. The flanges also provide a means of securing the panels to the floor, if the installation is to be of a permanent nature.

Quarter-round framing of each panel of Masonite gives the entire structure rigidity, and the use of 2 in. by 2 in. vertical posts at each joint and at each corner makes it self-supporting.

Dual-Purpose Flag pole

TAPERED, SEAMLESS aluminum poles have found a new use at several sewage disposal plants in Florida. The aluminum poles are being used in a dual role—flag pole and sewage gas vent stack.

At Coral Gables, Florida, a 39-ft pole, mounted on a special base, is

Pole finial is fitted with vents and exhaust dispersers, also flag hardware

directly connected to the system's main chamber. Aluminum's resistance to corrosion caused by chemically active gases, as well as to the corrosion of the seacoast atmosphere, prompted choice of the metal for the poles, made by Hubbard Aluminum Products Co.

The finial includes a diffuser plate and exhaust vents to discharge and disperse gases carried to the pole top.

Hot Spray Painting for Planes

PAINTING of B-57 Air Force bombers is being completed one-third faster than was formerly possible at Martin Aircraft, since the installation of a hot-paint airless spray unit. Paint is taken from a standard tank, heated to 165 F, and hydraulically pressurized to 600 psi. Under these conditions of

SPECIAL

Industrial and municipal turbine generator specialists give priority service up to 15,000 kw.

Worthington specialists in designing and manufacturing turbine generators up to 15,000 kw. are changing a lot of established buying ideas. Because they're not involved with building the huge central station turbine generators, Worthington engineers can give A-1 priority to every phase of design and manufacture of industrial and municipal units. They deliver a power package that has been completely tested, and adjustments made, to shorten installation time. They incorporate latest design advances in the turbine and generator, and finish the job with a streamlined heavy steel jacket to blend with the most modern power plant design.

When considering a turbine generator installation up to 15,000 kw., call on specialists in the field. Call your nearest Worthington District Office or write for Bulletin 1960C: Worthington Corporation, A&SP-Turbines, Harrison, N. J.

WORTHINGTON

$250 Saved Yearly in Lubricant Alone
on Each Gear Hobber with SPRAY-LUBE*

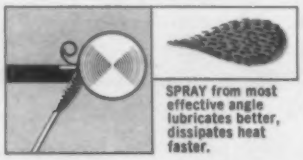
...Cullman Wheel Co. also reports substantially increased tool life, safer, cleaner working conditions, less machine cleanup time.

Cullman Wheel Company in Chicago is a leading manufacturer of chain drives and other power transmission equipment. Dissatisfied with the performance of flood systems of tool lubrication, they tried Norgren SPRAY-LUBE on one of their gear hobbers.

Results of the trial were so favorable that they at once began converting the coolant systems on other gear hobbers and shapers to Norgren SPRAY-LUBE.

Today, from the many SPRAY-LUBE applications in their plant, they have reported the following facts:

Norgren SPRAY-LUBE applies a spray of cutting oil upon the close interfaces at the cutting area, providing a more thorough lubrication at the cutting point between the tool and work piece. As a result, tool life has substantially increased.



SPRAY-LUBE sprays lubricant exactly where it is needed with no waste. It does a much more thorough lubricating job, using considerably less lubricant. In fact, savings in lubricant cost alone are averaging $250 a year per machine —enough to pay for the Norgren SPRAY-LUBE System in about 6 months.

In addition, SPRAY-LUBE has provided other valuable advantages —improving product finish . . . simplifying chip removal . . . reducing machine cleaning time . . . and providing safer, cleaner floor conditions around the machines.

Norgren SPRAY-LUBE saves nearly $250 a year in coolant cost on Gould & Eberhardt gear shaper.

Without obligation, learn how Norgren SPRAY-LUBE can reduce costs in your plant. Call your nearby Norgren Representative listed in your telephone directory — or **WRITE THE FACTORY FOR BULLETIN 537.**

C. A. Norgren Co.

3443 So. Elati St., Englewood, Colorado

Pioneer and Leader in Oil-Fog Lubrication Since 1930

**For complete information about this application, write for Norgren Blueprint SL-7.*

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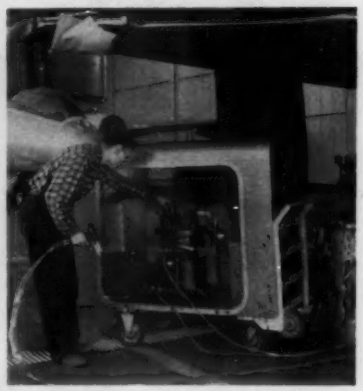
OPERATION—PRODUCTION

(O and P begins on page 52)



Spray painter adjusts pressure and temperature regulators on mobile unit

heat and pressure, the solvents atomize the paint at the spray nozzle—and this atomization results in application of more paint solids to the surface than were applied with conventional air-spray methods.

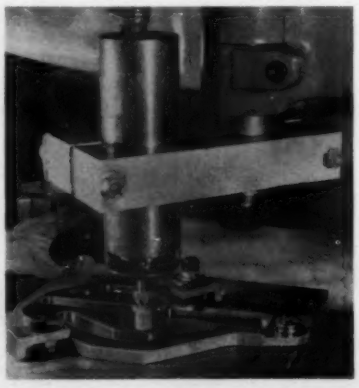
The resultant finish, with only two coats, is smooth and high in gloss, as compared with the three coats formerly required to attain specification finish.

Die Sinker Adapted to Grind Cams

TOOL ENGINEERS at Glenn L. Martin Aircraft Co., Baltimore, have replaced the conventional cutting head of a die sinking machine with a high speed air motor fitted with a grinding head.

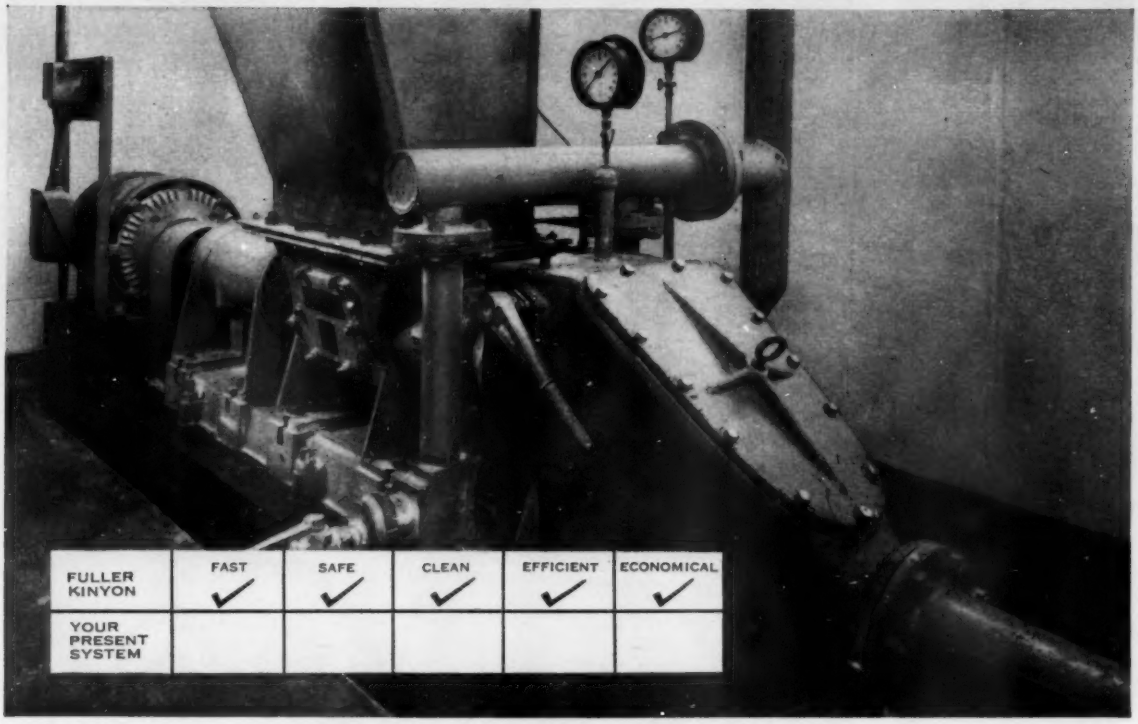
With the pantograph tracing feature of the die sinking machine available, the conversion facilitates precise grinding of cam follower surfaces.

Constructed for use on short run jobs, the converted die sinker eliminates the need for purchasing special grinding equipment for short run jobs.



Clamping block holds air motor in position on die sinker, to grind cam surfaces

How many can't you check...



	FAST	SAFE	CLEAN	EFFICIENT	ECONOMICAL
FULLER KINYON	✓	✓	✓	✓	✓
YOUR PRESENT SYSTEM					

Fuller-Kinyon pump conveying flash-dried starch to dextrine or starch bagging department at rate of 12,500 lb. an hour. Conveying distance 600 feet.

. . . against your present dry pulverized materials handling method?

If there's just one of these practical features that you *can't* claim, you can be sure that its lack is adding a substantial amount to your annual conveying costs. To move bulk Portland cement, pulverized coal, limestone dust, flue dust, fly ash, starch, pulverized phosphate rock or any other dry materials of similar consistency, a Fuller-Kinyon System designed specifically for your plant will provide the best combination of efficiency and economy available and also afford the "extras" of safety, speed and cleanliness.

A FULLER-KINYON SYSTEM:

- *harnesses air to do the work
- *eliminates fire and explosion hazards
- *operates anywhere a pipeline can be run
- *entails no complicated or costly installation factors
- *reduces maintenance sharply
- *can be operated by one man
- *eliminates spillage—waste

Proof that these advantages have been long recognized is the fact that one or more Fuller-Kinyon Systems are serving in 98 per cent of the nation's cement mills as standard primary conveyors. Take a leaf from this service record. Get the facts as they apply to your plant and put Fuller's 30 years of pneumatic conveying experience to work for you.

FULLER COMPANY GENERAL AMERICAN TRANSPORTATION

P-163
3019

Fuller
. . . . pioneers in harnessing AIR

FULLER COMPANY
138 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Chicago · San Francisco · Los Angeles · Seattle · Kansas City · Birmingham

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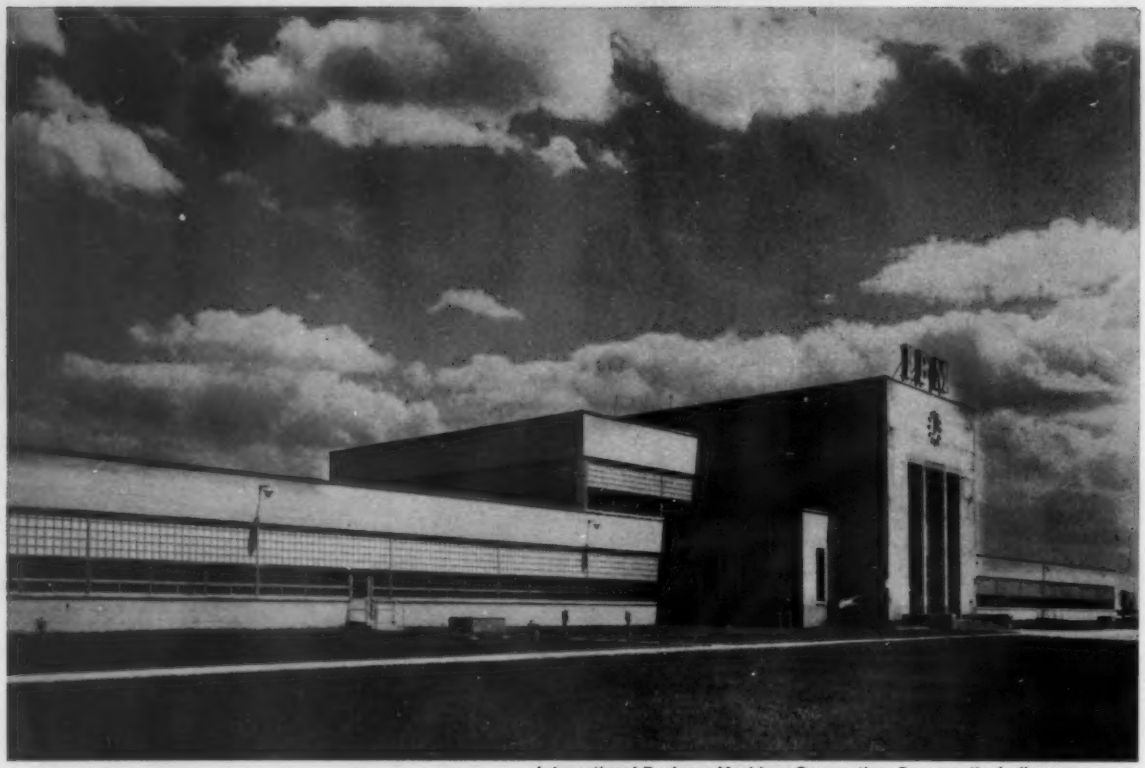


International Business Machines Corporation, Greencastle, Indiana
Engineers and Architects: Giffels & Vallet, Inc., L. Rossetti, Detroit, Michigan

IBM benefits 4 ways with PC Glass Block Panels

- *Controlled daylighting*
- *Reduced heating and cooling costs*
- *Elimination of sash maintenance costs*
- *Minimum washing contract costs*

IBM and its architects were well aware that the intricate production jobs handled at this plant would require plenty of daylight. But it had to be the right kind of daylight—controlled and glare-free. Insulation value of the window areas was another consideration—ordinary windows in a continuous band 8½ feet high *could* throw an excessive and costly load on the heating and air conditioning systems. And what about maintenance and washing? Costs for these items *could* jump way out of line unless steps were taken to remove the causes of these headaches.

This planning led to the use of PC *light-directing* Glass Block panels, footed by a double-glazed vision strip. The blocks, *mortared* into five-foot high panels, bring in controlled daylight that helps workers see better. Insulation value of the glass blocks (equal to that of an 8-inch masonry wall) reduces heating and cooling costs. And because there is nothing to rust or rot, the glass block panels are maintenance-free. A twice-a-year washing is all that's necessary.

For new construction or modernization, you'll find it profitable to investigate the advantages of PC Glass Blocks. For more information, see us in Sweet's, or write Pittsburgh Corning Corporation, Dept. PG-56, One Gateway Center, Pittsburgh 22, Pa. In Canada: 57 Bloor Street West, Toronto, Ontario.

PC Glass Blocks mean better looks outside—better light inside.

PC Glass Blocks

PITTSBURGH PC CORNING®

Also manufacturers of FOAMGLAS® insulation

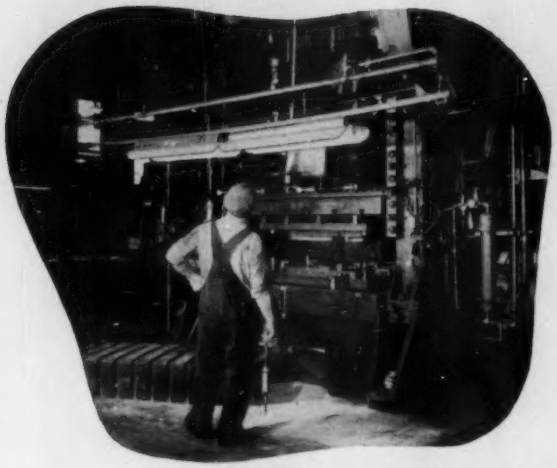
For more facts circle 554 on Reply Card

For more facts circle 555 on Reply Card →

SAVINGS START

when you stop "hand feeding" hungry bearings...and change lubrication methods from

Backward to Forward!



ALEMITE PORTABLE POWER GUN

saves 23.9 man-hours for every 100 pounds of lubricant

...saves right down the line!

• A 400-pound barrel of lubricant—any type—arrives at plant oil room. It's sealed, fresh, "refinery-clean."

• An Alemite Power Transfer Pump is inserted in drum. Lubricant stays sealed against dirt, grit, contamination.

• In just 60 seconds a portable power gun is filled with lubricant that is still as fresh as when it left the refinery. No mess—no waste!

• Alemite Portable Power Gun is ready to roll anywhere in the plant . . . to service hundreds of bearings with clean, safe lubricant!

Are you lubricating hundreds of bearings with ordinary hand gun equipment that's best suited to service only a *couple of dozen bearings?*

An ordinary hand gun can be emptied in a few minutes. But an Alemite Power Gun gives positive, fast, safe lubrication to hundreds of bearings *without a single re-fill!* This difference means a saving of 23.9 *man-hours* on every 100 pounds of lubricant used. Because lubricants are always kept "refinery-fresh," machines get better protection, have less breakdowns. You make important *savings in machine-hours* . . . increase production, cut maintenance costs!

An Alemite Portable Power Gun eliminates wasteful spillage . . . makes housekeeping easier, less expensive . . . reduces product spoilage. Air or electrically operated models for all types of lubricants. There's a type and size pump for your plant. Mail coupon at right for the full story about Alemite savings!

FREE! New Booklet:
"5 Plans for Better Lubrication"
Alemite, Dept. G-56, 1850 Diversey Parkway
Chicago 14, Illinois

Please send me my FREE copy of "5 Plans for Better Lubrication."

Name_____

Company_____

Address_____

City_____ **State**_____

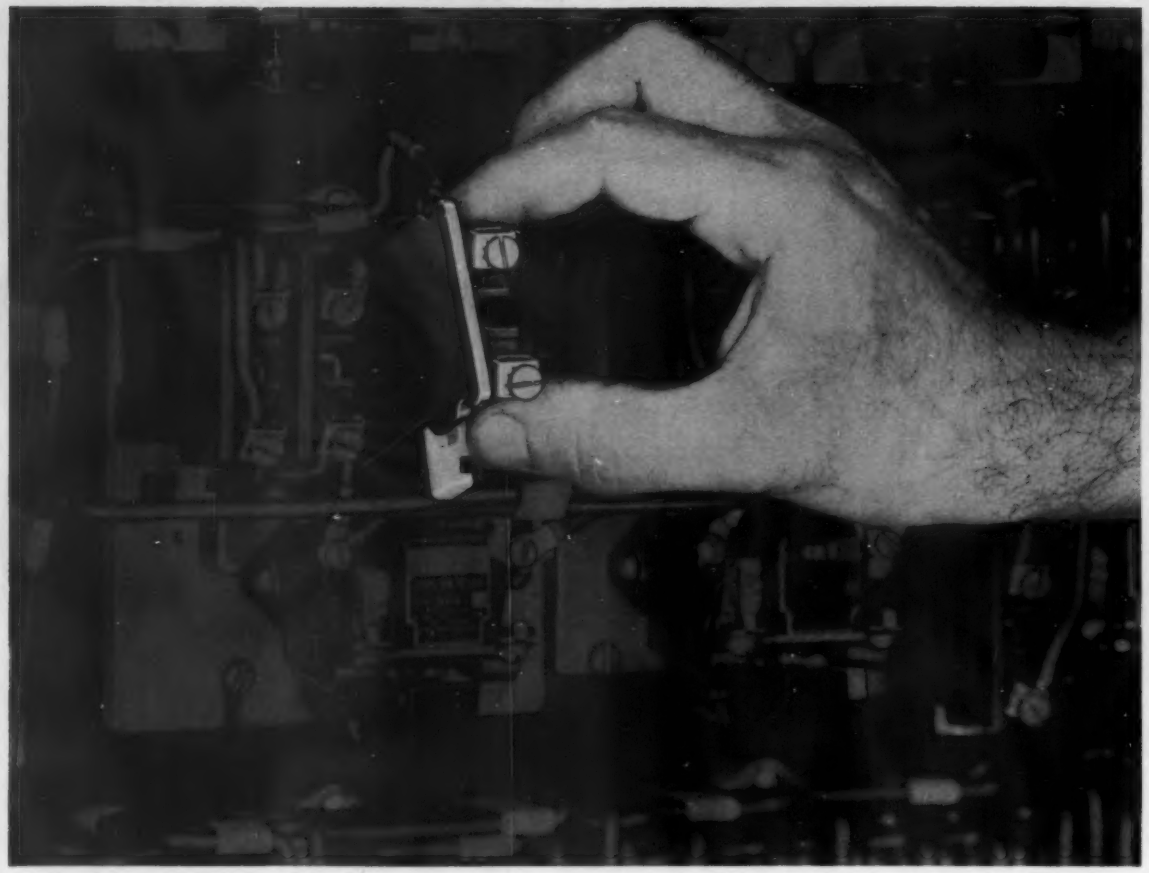
ALEMITE

REG. U. S. PAT. OFF.

Ask anyone in industry

A PRODUCT OF SW STEWART WARNER

A Product of STEWART-WARNER CORPORATION

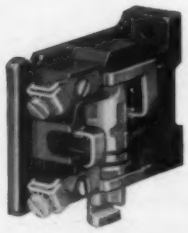


You can easily remove a single pole from any CLARK Type "PM" Relay

Each pole in the new CLARK heavy-duty relays is an integral unit that can be quickly removed or replaced *from the front* without disturbing other poles. You need disconnect only two wires and loosen one mounting screw—regardless of the number of poles in the relay. Compare this with other types of relays where the whole device must be removed to accomplish the same thing. For example, with a conventional 6 pole relay, 14 wires and 3 mounting screws must be removed.

All terminals are located on the front. They are "pressure" type, eliminating need for looping wire. Coil-changing and magnet replacement can also be done quickly from the front without removing relay from panel.

Write for Bulletin PL-7305



Each pole is contained in its own melamine housing.

A short circuit through one set of contacts is confined to a single pole and will not destroy the whole relay. Enclosed top protects from dust and dirt, and serves as wiring shelf.

The **CLARK** **CONTROLLER** *Company*

Engineered Electrical Control

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

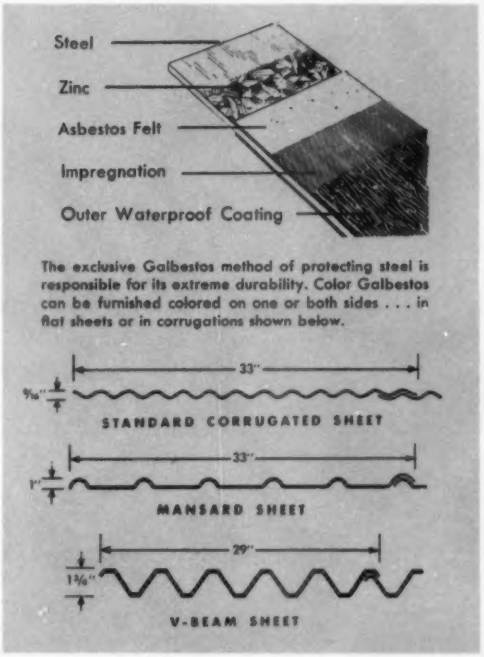
For more facts circle 556 on Reply Card

For more facts circle 557 on Reply Card ⟶

Low cost, maintenance-free beauty for your roofs and sidewalls . . .

After decades of research and more than seven years of exhaustive tests held under the auspices of its multiple fellowship at the famed Mellon Institute of Industrial Research, H. H. Robertson Company is proud to announce Galbestos roofing and siding in four attractive new colors—red, green, buff, gray. Galbestos in black or maroon has long been the standard of perfection among protected metal roofing and siding materials for its maintenance freedom, long-life resistance to fire and corrosion, and ability to withstand extreme weather conditions. Color Galbestos has proven itself equal or better in every respect.

With Color Galbestos you now can have colored roofs and sidewalls at a lower cost than that possible by any other means. These new colors and the three standard corrugations shown at the right, used singly or in combination, open a new field of decorative treatment for industrial and commercial structures. Use the coupon to write for literature.



The exclusive Galbestos method of protecting steel is responsible for its extreme durability. Color Galbestos can be furnished colored on one or both sides . . . in flat sheets or in corrugations shown below.

ROBERTSON Color Galbestos

Pioneering in World Wide Building Service Since 1906

H. H. Robertson Company

2419 Farmers Bank Building • Pittsburgh 22, Pennsylvania

In England—Robertson-Thain, Ltd., Ellesmere Port, Cheshire
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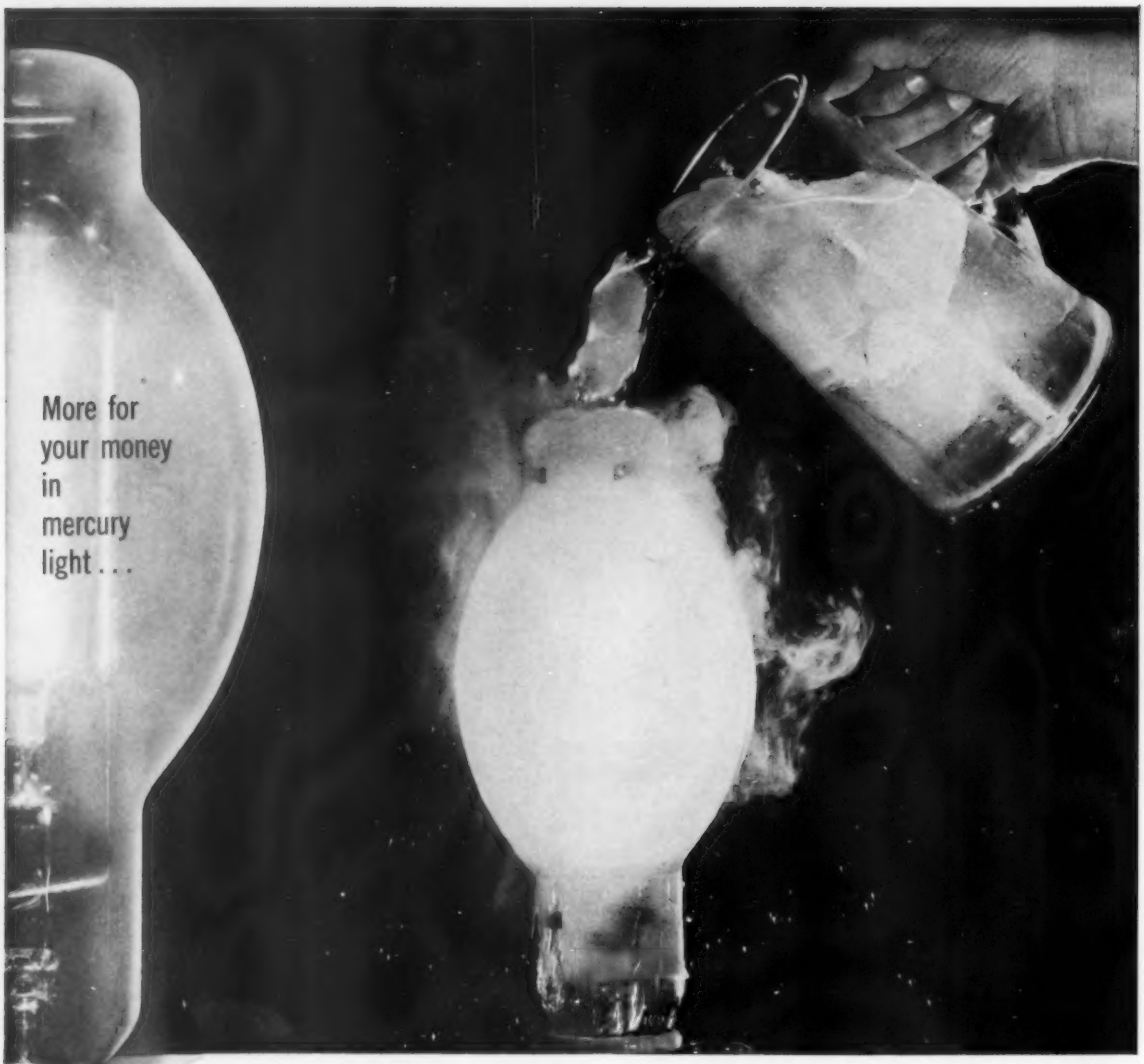
Please send additional information on Color Galbestos.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____ CITY _____



ANNOUNCING NEW WESTINGHOUSE WEATHER DUTY(TM) MERCURY LAMPS

Down again go your lighting costs as Westinghouse announces another basic improvement in high-intensity mercury lamps. It's the world's first line of *weather-resistant*, heavy-duty mercury lamps.

Made with hard, tough, thermally stable glass, new Westinghouse WEATHER DUTY Mercury Lamps can be burned outdoors unprotected in rain, snow or sleet with no risk of cracking. And they can be burned indoors in ventilated fixtures with no danger of shattering under water drops entering through the ventilating openings. Moreover, they are highly resistant to mechanical breakage and to the corrosive effect of industrial fumes.

Thus in any type of installation—indoor or outdoor—Westinghouse WEATHER DUTY Mercury Lamps save you money three new ways. First, by eliminating the need for protective shields and permitting the use of cheaper fixtures. Second, by doing away with costly shield maintenance. And third, by releasing the large amount of light wasted by dirty shields.

WEATHER DUTY Mercury Lamps are the latest example of how Westinghouse gives you "*more for your money in mercury light.*" Now available types E-H1-WD, J-H1-WD, A-H12-WD, C-H12-WD, A-H15-WD and B-H15-WD.

WESTINGHOUSE GUARANTEES the service life of all its widely used types of quartz mercury lamps. For full details call your Westinghouse Lamp Representative—or write Westinghouse Lamp Div., Dept.PE3, Bloomfield, N. J. "You can be sure if it's Westinghouse."

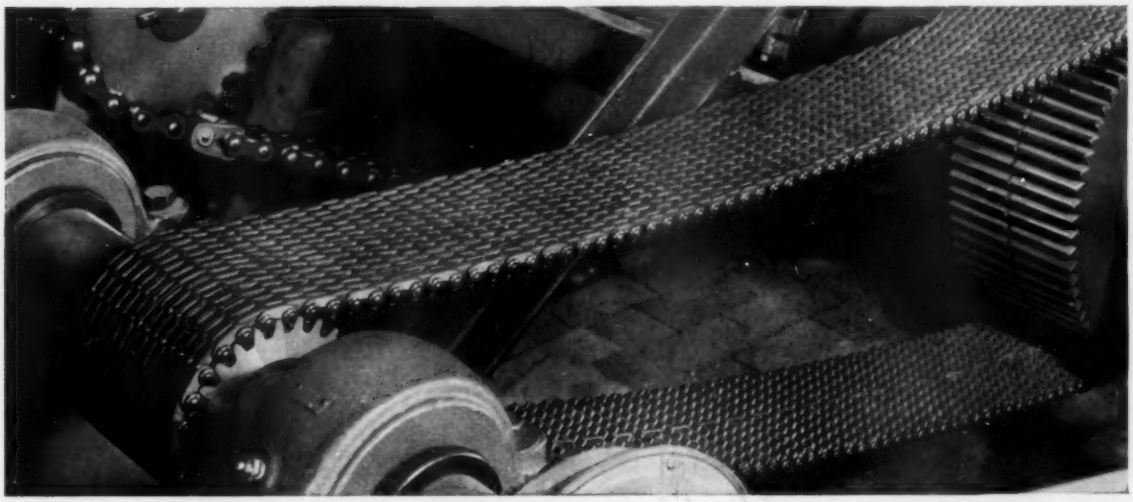
WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU***

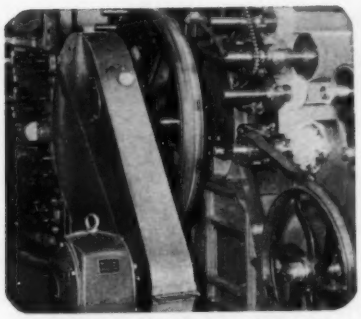
For more facts circle 558 on Reply Card

Check your drives against the benefits of

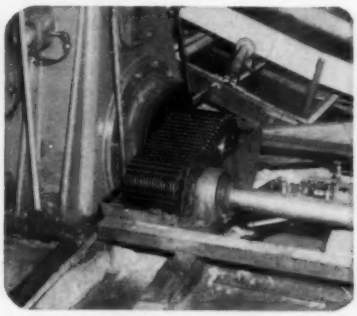
LINK-BELT silent chain



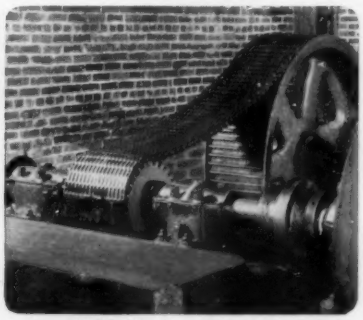
☐ **HIGH SPEED.** Link-Belt silent chain drives are noted for slipless dependability—maintain better than 98% efficiency whether operating over large or small diameter wheels or on long or short centers. For further details on these and more advantages, call your Link-Belt office or authorized distributor.



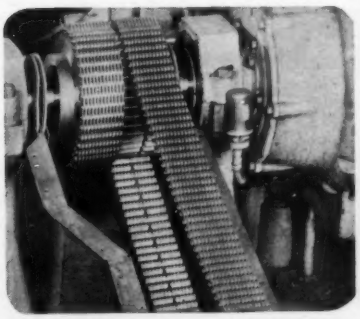
☐ **ADVERSE OPERATING CONDITIONS.** Heat, humidity, cold do not lower Link-Belt silent chain's great efficiency.



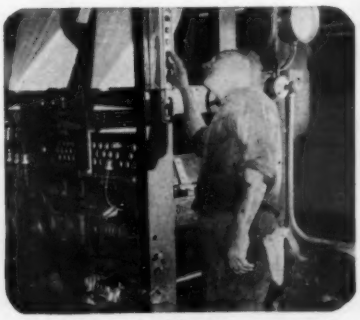
☐ **LARGE OR SMALL HP.** A versatile line, these Link-Belt drives are available from fractional to thousands of hp.



☐ **LARGE RATIOS.** Link-Belt silent chain operates efficiently on extremely short centers at ratios as high as 10-to-1.



☐ **LIMITED SPACE.** Easy to assemble in close quarters, Link-Belt silent chain permits built-in drives, compact housings.



☐ **LONG LIFE.** After 13 years on this newspaper press at speeds up to 4,700 fpm, Link-Belt silent chain is still efficient.

Ask for 88-page Book 2425 — complete data on Link-Belt silent chain drives.

LINK-BELT

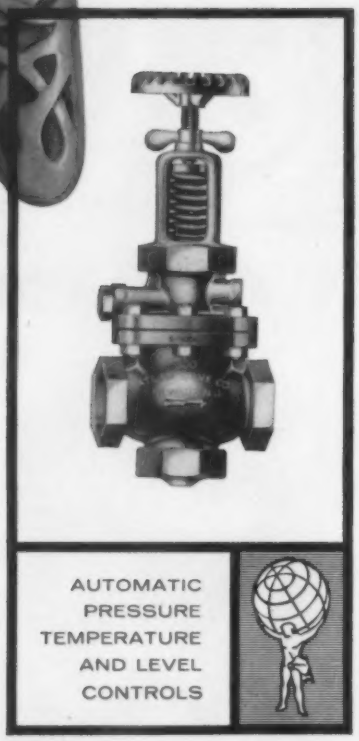
14.035

SILVERSTREAK SILENT CHAIN DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

For more facts circle 559 on Reply Card

REMEMBER WHEN GRANDAD USED THIS ?



AUTOMATIC
PRESSURE
TEMPERATURE
AND LEVEL
CONTROLS

When Grandad stropped the straight edge and Sunday finery meant gaiters and whalebone, the first Atlas regulators stepped off the drawing board and into the plants and ships of booming America. Born at the height of the industrial revolution, the Atlas line of pressure and temperature regulators grew rapidly to meet the exacting standards of power and plant engineers. Today, the modern Atlas line embodies every advance that progressive design and manufacture brings. When you specify Atlas valves, you call on 65 years of experience, tradition and technical leadership.

For the full story, write for our new condensed catalog 56 C.

ATLAS VALVE COMPANY

280 SOUTH STREET • NEWARK 5, N.J.

Representatives in principal cities of U.S. and Canada

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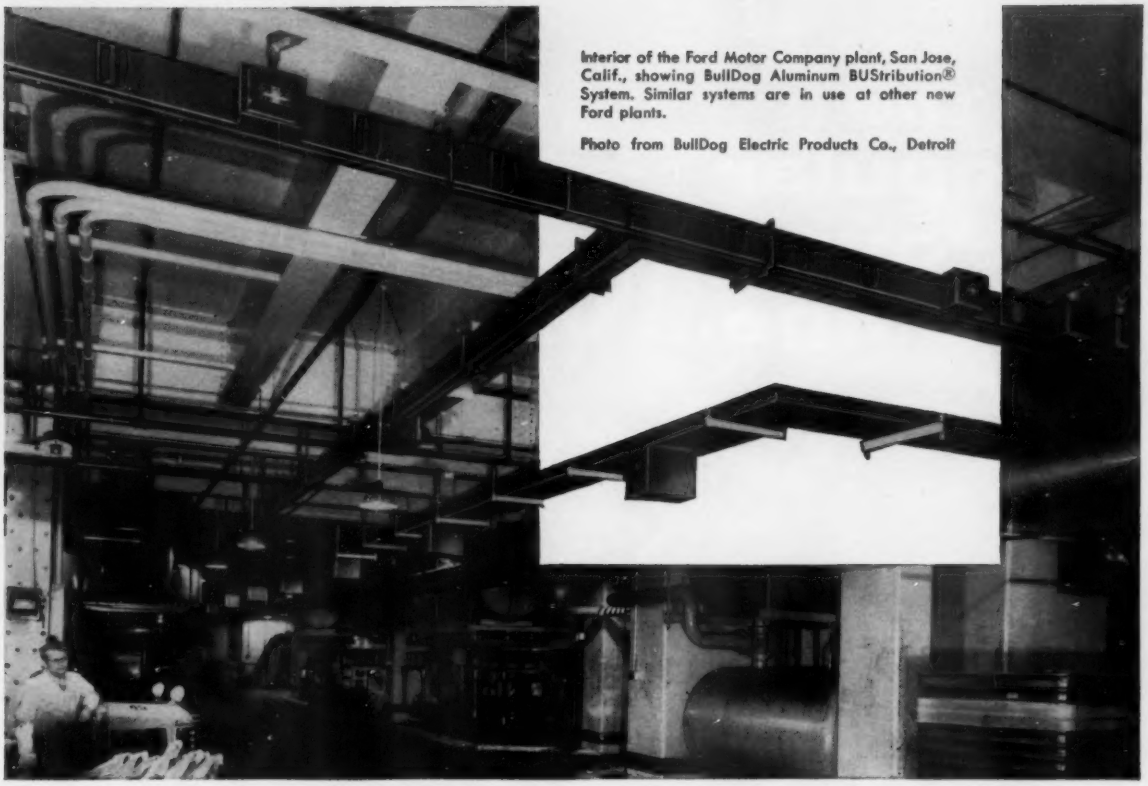


Interior of the Ford Motor Company plant, San Jose, Calif., showing BullDog Aluminum BUStribution® System. Similar systems are in use at other new Ford plants.

Photo from BullDog Electric Products Co., Detroit

FORD INSTALLS BUSWAYS USING 1,500,000 POUNDS OF ALUMINUM CONDUCTOR

Installation costs less, provides more power per pound of metal. System is more flexible and operates with no increase in voltage drop or temperature rise over comparable copper system.

Since 1951, Ford Motor Company has been equipping its new plants with aluminum bus distribution systems. These include plants at Detroit, Chicago, Buffalo, Cleveland, Louisville and San Jose.

By switching to aluminum, Ford diverted more than 3 million pounds of critical copper to other uses. And Ford acquired a distribution system at lower cost.

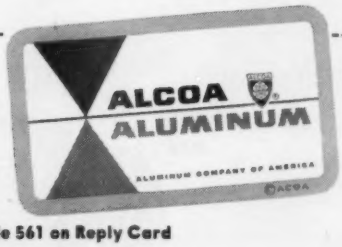
Because aluminum is lighter, Ford received more conductor per pound of metal . . . put less weight on the building superstructure.

Because aluminum costs less than copper, Ford received more conductor per dollar invested.

And these prefabricated conductors make a neat, safe, flexible installation that brings power to the job in any amount at any location. They can be readily moved to meet new power demands. Standard fittings, tools and methods are employed.

For more information on these modern packaged plant distribution systems, contact your nearby Alcoa sales office. Or write Aluminum Company of America, 2301-E Alcoa Bldg., Pittsburgh 19, Pa.

Your Guide to the Best in Aluminum Value



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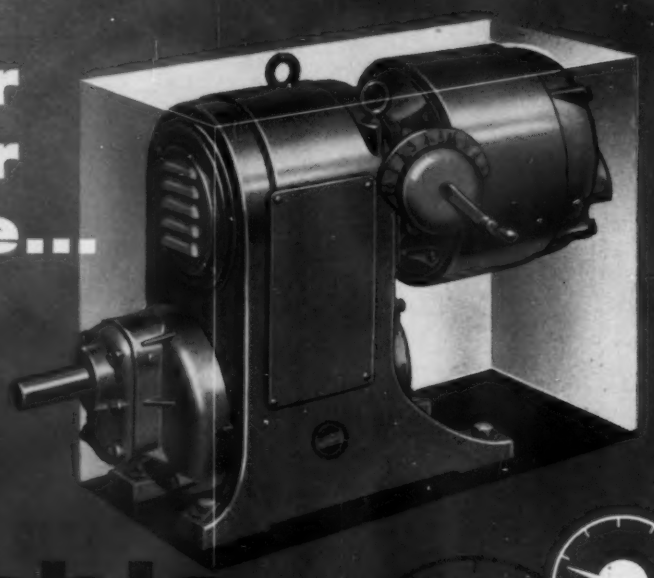
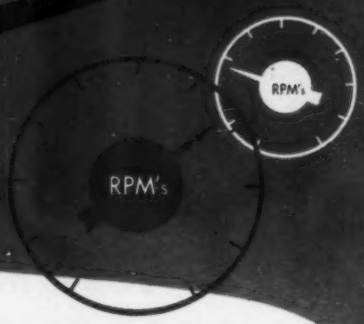
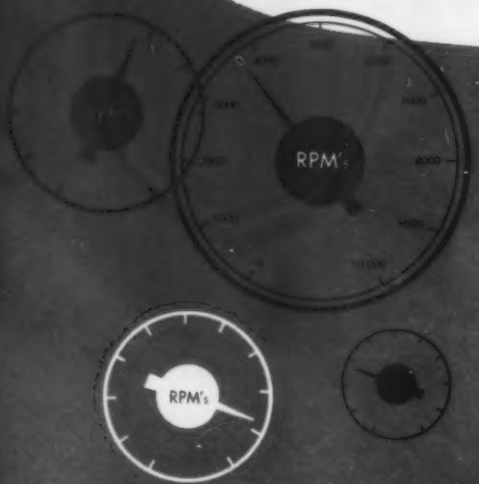
The Popular Power Package...



for Variable Speeds...



U. S. Varidrive



This popular unit combines an induction motor, variable speed drive, and gearing to give a complete variable speed power source. Often used to replace constant speed motors, it is easily installed and occupies minimum space. Rugged industrial construction gives long life even when operated under severe conditions. It requires no extraneous electronic equipment or bulky power conversion devices. Varidrives are popular with equipment manufacturers because they increase versatility and saleability of their products. Available from ¼ to 60 h.p., speed ranges cover 2 to 10,000 rpm.

U.S. Electrical MOTORS

PLE-5

U. S. ELECTRICAL MOTORS Inc.
P.O. Box 2058, Los Angeles 54, Calif., or Milford, Conn.
☐ Send Varidrive Bulletin No. F-1797.

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Company_____

Address_____

City_____ Zone____ State_____

MAIL COUPON NOW

COURT DECISIONS — a summary of legal findings of interest to the plant engineer

Prepared by Albert Woodruff Gray

Buyer's Right to Inspect

SAMPLES OF spandrel copper flashing submitted by the manufacturer to a purchaser showed an excess of 3 oz of copper per foot. The buyer purchased 160,000 ft. After approximately 144,000 ft had been installed, the buyer discovered that the flashing contained less than one ounce of copper per foot, the shortage concealed by an excessive use of mastic.

In his defense to the suit by the purchaser, the manufacturer contended that the purchaser by his acceptance and use of this material had waived his right to any objections he might otherwise have made to the absence of the stipulated proportion of copper.

"Because of the relative thickness and stiffness of the asphalt and the fabric which completely covered the copper, it is not possible to tell by feeling or surface examination of the completed product if a substitution has been made," said the Federal court, in granting a judgment to the purchaser for fraud.

"On the other hand there was nothing about the flashing which put the purchaser on notice that it was substandard. I rule that under the circumstances it had no duty to examine for other than obvious defects and I find that there was no such defect." Barrett Roofing & Supply Co. v. Ross, 131 F. S. 348.

Liability for Defects

WHEN A SUMP PUMP, sold by a plumbing and heating contractor, was found defective, suit was brought by the purchaser on the ground that this dealer either knew or should have known of the defects. Also that in offering for sale and installing the pump, the dealer was negligent and answerable in damages.

In its decision in favor of the dealer, the court summarized the instances in which a dealer may be held liable for such defects. "The exceptions are," said the court, "(1) an act of negligence which is imminently dangerous to the life and health of mankind in the preparation or sale of an article intended to preserve or affect human life; (2) an owner's act of negligence which causes injury to one who is invited by him to use his defective appliance on the owner's premises; and (3) when he sells or delivers an article which he knows to be imminently dangerous to the life or limb of another without notice of its qualities to a person who suffers an injury therefrom which might have been reasonably anticipated, whether there was any contractual relation between the parties or not.

"These exceptions have been applied in cases of personal injuries but no case has been found or called to my attention where they have been extended to include damage to personal property as in this case." Russell v. Sessions Clock Co., 116 Atl. 2d 575, Connecticut.

Disturbing Noises

THE OWNER of an air conditioning unit, used in his home, was charged with a violation of a criminal law prohibiting the creation of all disturbing and unnecessary noise.

"The crux of the case," said the court in dismissing this charge, "involving the question whether a person is committing a nuisance, civil or criminal, in the maintenance or use of his own property, is the rather indefinite test of whether he is making a reasonable use of his property.

"These cases generally involve two general but conflicting principles of law—the right to use one's property as one sees fit and the duty to refrain from using one's property in such a manner as to produce injury to others. It is a general rule that every person may exercise dominion over his own property and subject it to such uses as will best subserve his private interests.

"Generally no other person can say how he shall use or what he shall do with his property. But this general right of property has its exceptions and qualifications. Persons living in organized communities must suffer some damage, annoyance and inconvenience from others. For this, they are compensated by all the advantages of civilized society. If one lives in a city he must expect to suffer the dirt, smoke, noisome odors, noise and confusion incident to city life."

Guarantee of Payment

LABOR AND MATERIAL had been furnished a corporation by an Oklahoma oil well supply company. In the course of these transactions the president of the corporation had assured the supply firm that he would be personally responsible for the payment of the services and material that had been furnished.

Later in its refusal to permit a recovery against this individual for the debt of the corporation, the Oklahoma court said of the liability of the individual under an oral promise of this character,

"Regardless of what was said he could not, because of the statute of frauds, be held personally responsible for the then existing account of the corporation without a written memorandum binding him. As to charges after this promise was made, his liability depended upon whether or not the credit was extended solely to him as an individual.

"The determination of whether a promise is an original promise as distinguished from a collateral one, depends upon whether credit is extended solely to the promissor or whether the indebtedness is also primarily the indebtedness of the third person to whom the consideration moves. If credit is given solely to the promissor it is an original promise and not within the statute of frauds, but if any credit be given to a third party the promise is collateral and must be in writing." Gutowsky v. Halliburton Oil Well Cementing Co., 287 Pac. 2d 204, Oklahoma.

Damages For Delay

SUIT BY A manufacturer of hoisting machinery to be installed on a spillway of the Lavon Dam on the Trinity River northeast of Dallas, Texas, was brought against the general contractor for the recovery of an unpaid balance of $33,309.61, claimed to be due under this subcontract. Under the agreement of the prime contractor with the government the construction of this project was to commence on February 3, 1950 and to be completed on September 20, 1952 with a penalty of $200 per day as liquidated damages for delay.

Between four and five months after the date stipulated for the commencement of the work the Korean War intervened and on February 7, 1952, the United States District Engineer wrote the prime contractor, "It has been determined that delay in the performance of said contract was due to causes beyond your control and without your fault or negligence, namely delay in delivery of critical material. Therefore the time for completion of

←——For more facts circle 562 on Reply Card

COURT DECISIONS

performance under said contract is hereby extended to the 26th day of February, 1953."

In its defense to this suit by the hoisting machinery manufacturer, the general contractor set up a counterclaim for $29,583.78 for additional costs, rental of machinery and loss of interest on contract money withheld, incurred through delays in performance by this manufacturer.

In awarding judgment to the hoisting machinery manufacturer the Federal appellate court said,

"The Texas courts are in accord with the law generally prevailing elsewhere that where performance becomes impossible by a change in the law the promissor is discharged.

"The Government for which the work was to be done prevented timely performance by its priority laws and regulations and by the delay of its engineers in the approval of plans and material. Justly it absolved its prime contractor for responsibility for such delays. It is not just nor right now to permit that prime contractor to charge its subcontractor with damages that were caused by the government." United States v. Texas Construction Co., 224 Fed. 2d 289.

Agreement for Settlement

UNDER A CONTRACT between a Missouri chemical company and a chemical processing plant, quantities of acid and alcohol had been delivered to the plant for processing and then returned to the company as ordered in metal drums supplied by the chemical company.

In a settlement of their accounts, the chemical company wrote this processing plant demanding possession of the drums and offering to pay its indebtedness of $4,692 for the processing of these acid and alcohol shipments. This letter had been returned by the processing plant with the endorsement, "The information outlined above with reference to the status of our accounts is correct and we agree to proceed as stated above."

Instead of doing so, however, the processing plant interposed an additional claim as a condition for its surrender of the drums in its possession. In an award of judgment against the processing plant, the Missouri court said,

"Our view is that this record reflects an honest effort by the chemical company to pay the processing plant the money due if the plant would return the company's property. This record reflects also a sustained and groundless refusal by the processing plant to accept the company's offer of performance and to discharge its own obligations.

"Moreover the attempt to attach new conditions to the original contract and the refusal to deliver the company's property unless it met them constituted a refusal to perform according to its terms. Furthermore the detention of the property of the company after its offer to pay in full under the terms of the original agreement constituted a conversion of the company's property." Diehr v. Thompson Chemicals Corp., 281 S.W.2nd 572, Missouri.

Public Nuisance or Lawful?

AN ELECTRO-PLATING plant was charged in a New York criminal court with maintaining a nuisance in permitting noises offensive and injurious to the residents of the neighborhood to emanate from the smokestacks of the plant.

The plant engineer assured the court that no known method of operation could eliminate or diminish these noises.

In its determination of the charge against the electro-plating plant, the court said in conclusion:

"The business is a lawful one and under the authorities its operation may not be deemed to constitute a public nuisance unless something that is done in the operation of that business is unlawful or its operation is negligent or improper in some degree or respect." People v. Abro Metallica, 125 N.Y.S. 2d 69, New York.

Severance Pay

SUIT BY 161 former employees of a New Jersey gas and electric utility was brought against the company for severance pay aggregating $147,625.13, claimed by these employees as due and payable to them. Provision in the labor agreement of these employees with the company was in part,

"Regular employees who have completed one year or more of continuous service and who are permanently released from employment because of reasons beyond their control, shall be given an allowance of one week's pay at the rate of pay at the time of the release, for each full year of continuous service."

Each employee, at the end of their service, had received from the president of the company a letter which was in part,

"The sale of our gas property to the New Jersey Natural Gas Co. has now been approved and consummated. It is the result of an order by the Securities and Exchange Commission that the company divest itself of its gas properties. You are one of these employees to be so transferred and I can truthfully say that I regret that it becomes necessary for you to leave the company."

In its disposition of the suit, the New Jersey court said:

"It seems almost beyond question that these employees were 'permanently released from employment' by the employer. The letter of the president, even if it be considered only an epistle of friendly farewell, made it plain to them that the company no longer had work for them to do because it had sold that portion of its business in which they were employed and that they must leave the company.

"No precise formality or notice or magic of exact language is necessary to constitute a dismissal or release. Any words or acts of the employer which show a clear intention to dispense with the employee's services are enough." Adams v. Jersey Central Power & Light Co., 114 Atl. 2d 776, New Jersey, May 18, 1955.

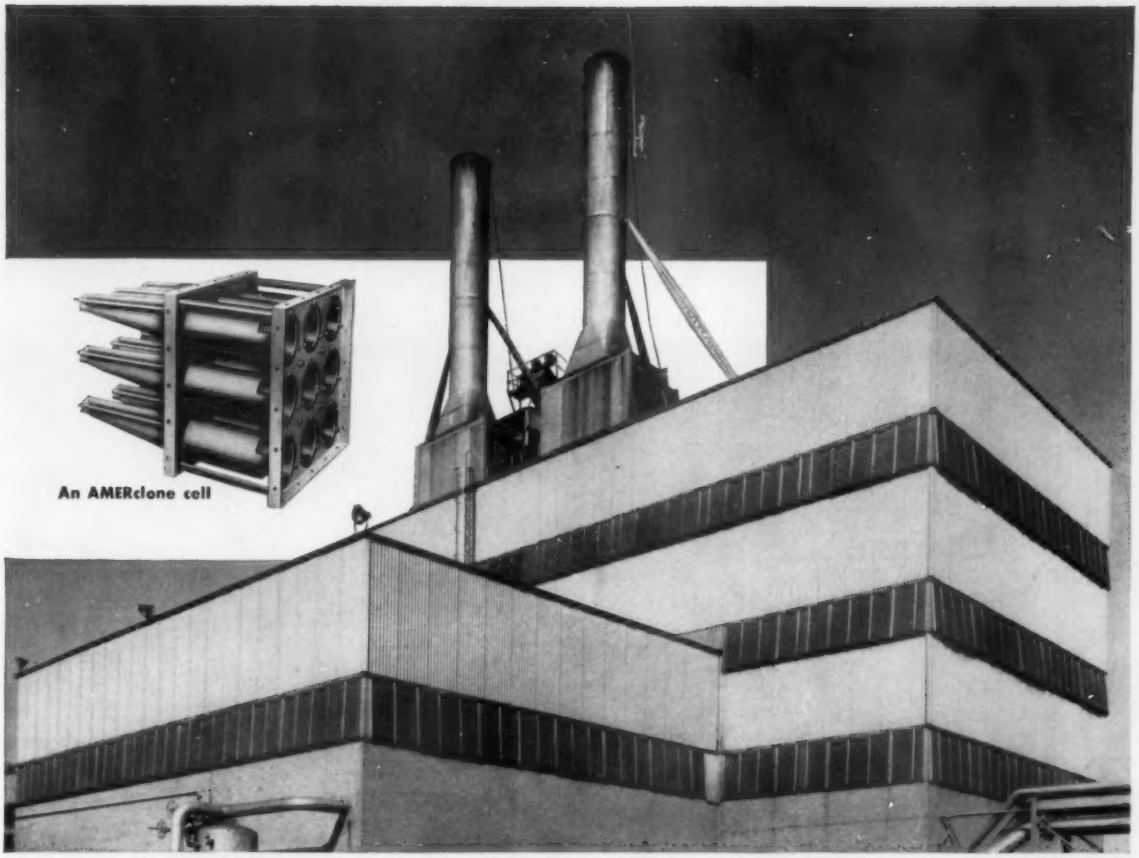
Indefinite Contract

UNDER A CONTRACT for the manufacture of lumber it was stipulated by the lumberman, "Lumberman agrees to furnish logs at such location for cutting by contractor in such quantities as lumberman deems feasible and economical, having regard for marketing conditions and availability of such logs in such vicinity."

"It seems fairly clear to us," said the court in its decision, "that this section of the contract clearly leaves to the lumberman the right at its option and discretion to determine what quantity of logs, if any, should be furnished for cutting into lumber by the contractor.

"There is no provision in the contract obligating the lumberman to furnish any specific number of logs nor is there any criterion furnished by the contract for ascertaining the number of logs to be furnished by the lumberman. The provision is that logs will be furnished 'in such quantities as the lumberman deems feasible and economical.'

"This means, as we interpret it, such logs as the lumberman should determine in its sole discretion to be feasible and economical. A reservation to either party to a contract of an unlimited right to determine the nature and extent of his performance renders his obligation too indefinite for legal performance." Smith v. Chickamauga Cedar Co., 82 So. 2d 200, Alabama.



An AMERclone cell

Both of the boilers at this Southern foundry were in operation when this photograph was taken. Note absence of any visible stack effluent.

AMERclone traps 5 TONS of fly ash DAILY!

Atmospheric Nuisance Eliminated by AAF Dust Control

Boiler fly ash that formerly "went up in smoke" (only to reappear on parking lots and the surrounding neighborhood) has disappeared from the scene at this Southern foundry. An AMERclone system on each of two boilers puts this menace in its place—in the dump, where it can do no harm.

AMERclone does the job, thoroughly . . . operates at 92% efficiency *at all times,* even though boiler room requirements fluctuate as much as 30% in any 24-hour period. High collection efficiency and maintained efficiency are just two of the dollars-and-cents advantages of AMERclone. This dry centrifugal requires less space than comparable units because each 20" x 20" cell (see inset in photograph) has a rating of 3,000 cfm! And the abrasive fly ash has little or no effect on AMERclone's tough, thick-wall gray iron castings.

Don't let a few tons of dust per day stand between you and better working conditions, better community relations. Get all the facts on AMERclone. Call your local AAF representative or write direct for Bulletin 291.

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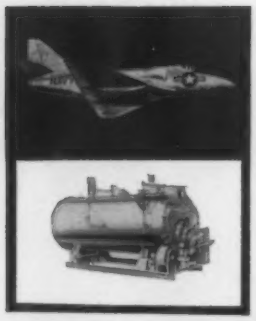
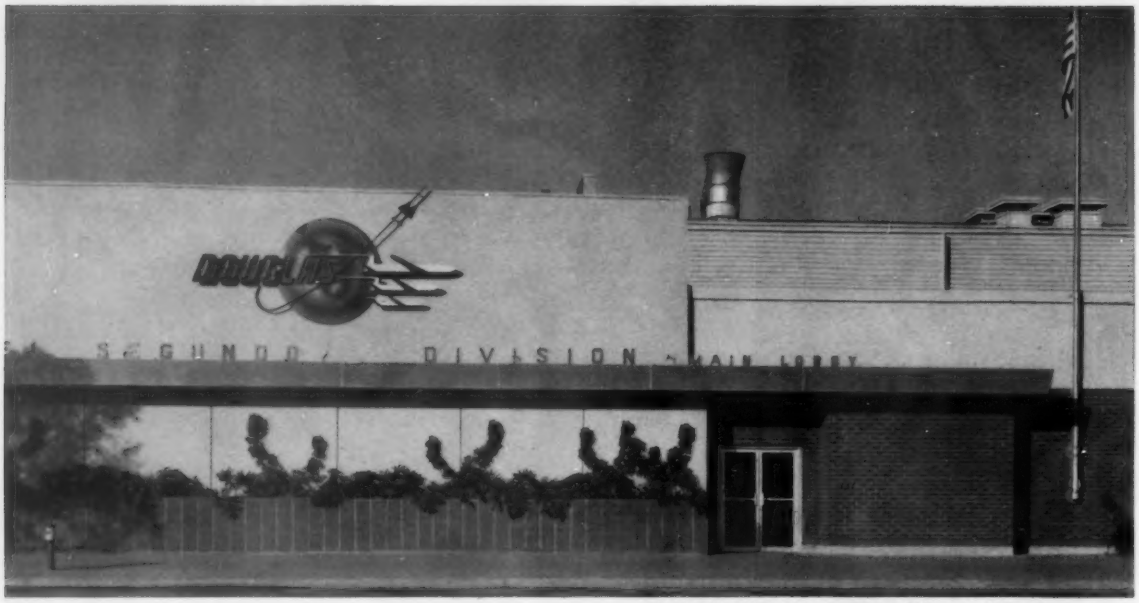
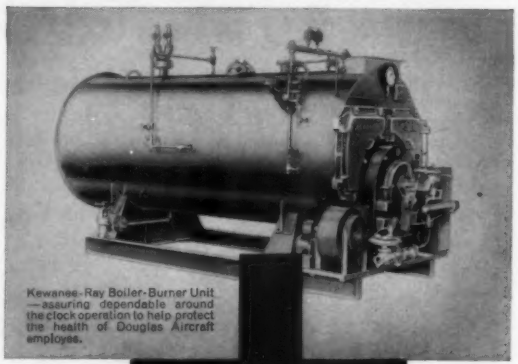


Sisters under the skin . . . when it comes to "cruising speed"



Douglas Aircraft Company, Inc. Division, El Segundo, California
Architect & Engineer: Holmes & Narver, Inc., Los Angeles, Calif.
Heating Contractor: E. Willardson, Inc., Los Angeles, Calif.

■ No one knows the importance of "cruising speed" operation in aircraft better than the Douglas Aircraft people. They know an airplane, to be efficient, to operate economically, to have longer life, must fly at "cruising speed." They know, too, there must be extra reserve power for take-off—for emergencies. So, when it came to boiler selection for the new A4D Skyhawk production facilities at their El Segundo, California Division, it was only natural they turned to Kewanee Reserve Plus Rated Boilers with 50% extra built-in power assuring "cruising speed" operation. For "cruising speed" means less strain—less wear. It means higher efficiency . . . it means lower maintenance and repair costs. Kewanee Boilers are rated on nominal capacity with reserve to take care of normal needs—meet emergencies of the present—fluctuating loads and future expansion. A boiler rated on maximum capacity, operating at constant top speed, requires more maintenance, constant attendance, and finer burner adjustment to maintain efficiency. So, choose Kewanee—for lower fuel and maintenance costs—more efficient "cruising speed" operation.



Kewanee-Ray Boiler-Burner Unit —assuring dependable around the clock operation to help protect the health of Douglas Aircraft employes.

KEWANEE
reserve plus rated

KEWANEE BOILERS

KEWANEE BOILER DIVISION of AMERICAN-Standard
101 Franklin Street, Kewanee, Illinois

You can depend on Kewanee engineering

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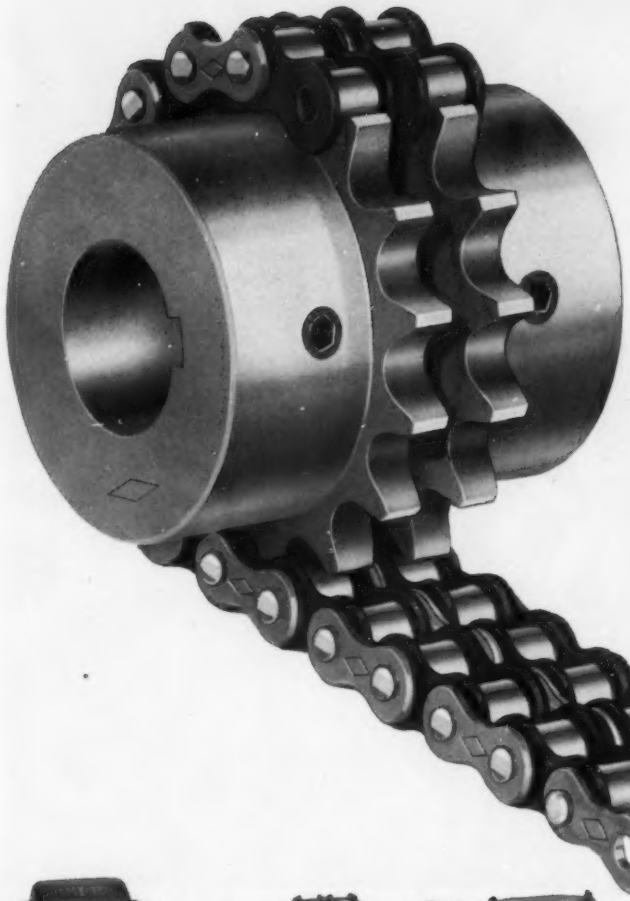
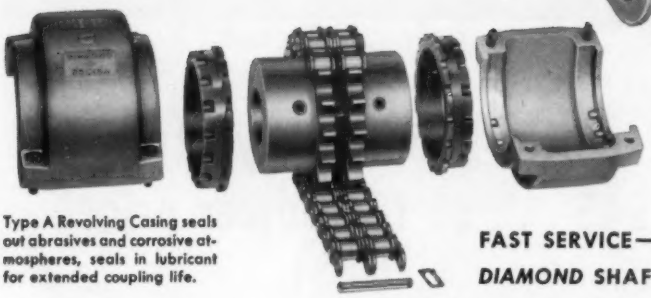


FLEXIBLE COUPLINGS—
FRACTIONAL TO HUNDREDS
OF HORSEPOWER
IN STOCK **AT YOUR**
DIAMOND DISTRIBUTOR

DIAMOND



Type A Revolving Casing seals out abrasives and corrosive atmospheres, seals in lubricant for extended coupling life.

FAST SERVICE—HIGH CAPACITY—SUPERIOR QUALITY
DIAMOND **SHAFT COUPLINGS**

◆ End to end shaft connections can be made quickly, inexpensively and in minimum space with Diamond Flexible Couplings. Load is carried at the greatest radius and distributed evenly over the entire length of chain for maximum capacity and life. Moderate angular and parallel misalignment as well as shaft end float are absorbed in the clearances between chain and sprocket teeth.

◆ You probably have many applications where the use of Diamond Flexible Couplings can provide improved operation and long dependable service. Call your nearest Diamond Distributor for immediate service. His name is in the yellow pages of the telephone book under the heading Chains or Chains-Roller.

Bulletin No. 19 contains complete selection data for stock Diamond Couplings. Your copy sent on request.

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DIAMOND **ROLLER CHAINS**

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New
GL-6807
THYRATRON
Replaces 5545.
All-new design!
Anode terminal is brazed solidly to the lead—won't come off.
Outside air cools anode and grid by direct thermal contact. Prevents overheating of the thyratron.
New, stronger cement assures a firm, lasting cathode base.
GENERAL ELECTRIC
Electronic TUBE

New long-life G-E motor-control thyratron outperforms Type 5545 . . . at 16% lower price!

NEW in design, with greater ruggedness, far longer life! New in the manufacturing techniques employed, so that General Electric tube distributors can bring you this improved thyratron at 16% lower price than the 5545 it replaces!

Features of construction prove that the GL-6807 is sturdier, more dependable than any previous thyratron. Outside-air cooling of anode and grid makes the tube virtually proof against overheating. The brazed anode terminal won't come off from rough handling. A new, strong cement base anchors the cathode solidly in place.

Ratings of the new tube are identical with the 5545 it replaces. These are: 6.4 amp avg current, 1500 v peak voltage, −55 C to +70 C ambient temperature range.

Cut your tube replacement costs 'way down . . . reduce motor downtime, maintain peak plant production . . . with General Electric's new long-life thyratron! Phone your G-E distributor to learn the low price-tag the GL-6807 carries, for increased economy! *Tube Department, General Electric Company, Schenectady 5, New York.*

Progress Is Our Most Important Product

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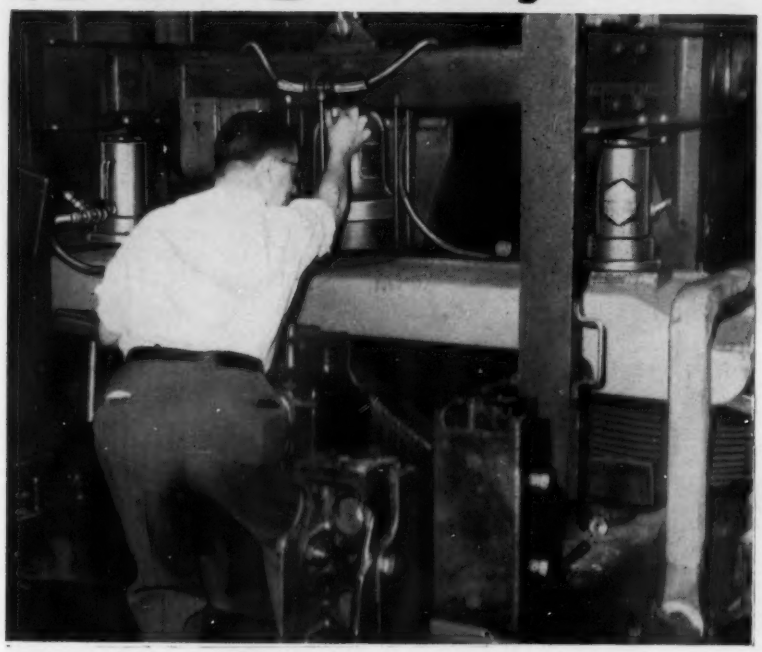
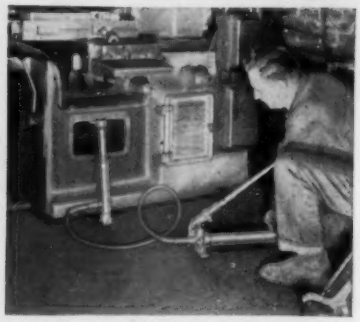
IDEAS with Hydraulic Power Tools

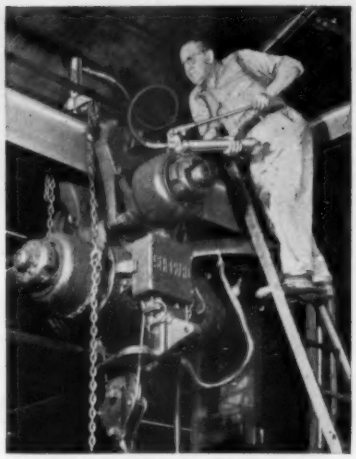




RELOCATING AND RELEVELING HEAVY MACHINERY are done quickly and accurately with "Porto-Power." Here only one man using "Porto-Power" equipped with plunger toe and "V" base attachments was needed — saving man hours by eliminating backbreaking, dangerous, crowbar methods.

Manufacturer builds own press to speed large assembly job

This huge press, used for compressing elliptical springs on a locomotive truck assembly, is powered by two 50-ton "Porto-Power" hydraulic rams served by one low cost, electrically driven pump. Finger tip control makes operation effortless, cuts job time and eliminates fatigue. Countless production, assembly, maintenance and construction jobs can be automated with Blackhawk Hydraulic Tools.



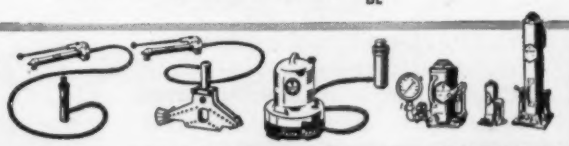
VERSATILE "PORTO-POWER" CUTS COSTLY DOWNTIME when breakdowns occur in vital materials handling equipment such as this overhead crane. Here, a 10-ton "Porto-Power" unit with chain pull plate lifts crane off track while new wheel is installed, saving over three man hours — nearly half a day!

"These Jacks can PUSH, SPREAD, CLAMP, PULL, PRESS, BEND"

Imagine the efficiency of just *one man* when Blackhawk "Porto-Power®" puts tons of force at his command to push and pull, lift and bend, press, spread and clamp . . . effecting vital savings of man-hours, money and materials on hundreds of industrial and construction jobs. Blackhawk builds industry's *most complete line* of hydraulic hand jacks and "Porto-Power" remote control jacks — with all necessary pumps, rams, kits, work attachments, valves and fittings. No wonder men who work with them say, "These hydraulic jacks do everything but walk and talk!"

See Sweet's Plant Engineering Catalog File IL/BL

IDEA MAN See your industrial distributor — or write today to Blackhawk — for free catalog H-201. It's packed with *specific ideas* for using Blackhawk Hydraulic Tools.



"Porto-Power" | Hydraulic pipe-benders and knockout punches | Power-driven hydraulic pumps | Gauge-equipped jacks | Hydraulic jacks thru 100 tons

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BLACKHAWK® WORLD'S LARGEST MANUFACTURER OF HYDRAULIC TOOLS

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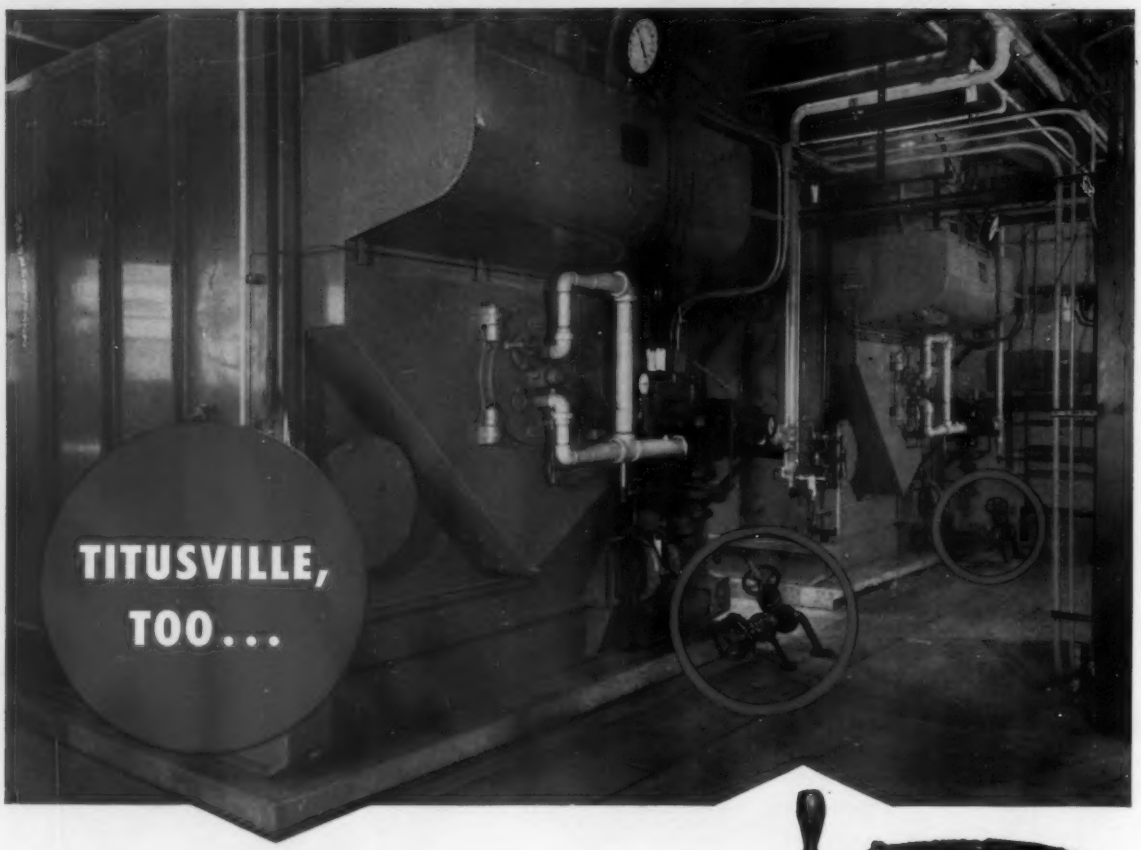

...SELECTS
YARWAY BLOW-OFF VALVES
FOR PACKAGE BOILERS

Take a look at the blow-off valves on this new Titusville Iron Works WTP package boiler—they're Yarway Seatless.

Titusville, along with most other manufacturers of water tube package boilers selects Yarway Seatless Blow-Off Valves to make *good* package boilers *better*.

Yarways seal drop-tight—have no seat to score, wear, clog or leak—combine good design with latest metallurgical improvements.

Whatever make of package boiler you buy, specify *Yarway Seatless* for the blow-off valves. *More than 16,000 boiler plants use Yarway Blow-Off Valves—some for 35 to 40 years!*

Write for full details in Bulletin B-426.

YARNALL-WARING COMPANY
145 Mermaid Avenue, Philadelphia 18, Pa.
BRANCH OFFICES IN PRINCIPAL CITIES

Yarway Type "B" Seatless Tandem, Blow-Off Valve. Note balanced sliding plunger design with no seat to score, wear, clog or leak. Pressures to 400 psi.

YARWAY BLOW-OFF VALVES

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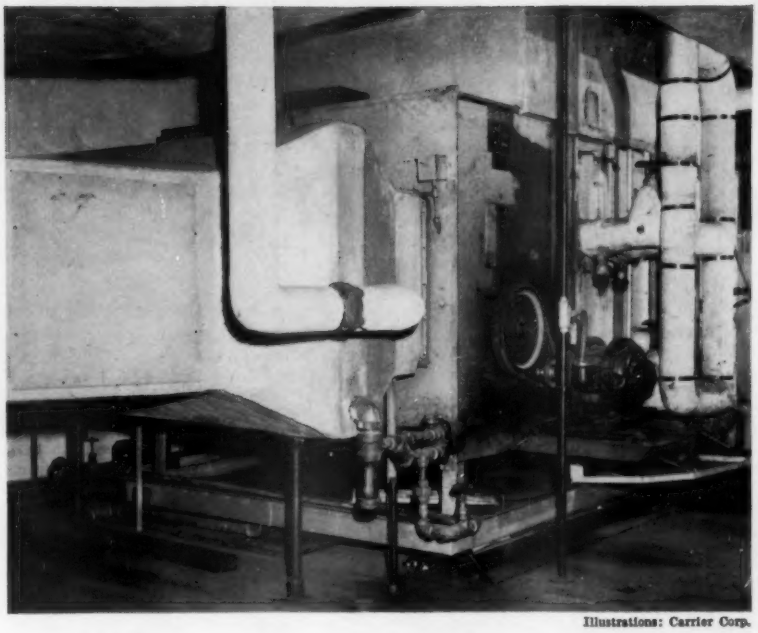


Fig. 1. One of the 26 central fan stations originally installed at the Elgin, Illinois, plant in 1937. Located in the attics of each building, these units were incorporated into the new air conditioning expansion program started in 1953

Illustrations: Carrier Corp.

Elgin Budgets Air Conditioning System

Six-Year Program Planned Because of Plant's Size and Age

By RICHARD McCORNACK, Chief Production Engineer, Elgin National Watch Co.

Fig. 2. View inside central fan station shows location of return duct grill

IT IS SAFE to say that industrial air conditioning will increasingly become the active concern of plant engineers. Since he is called upon to survey the plant's facilities to determine what air conditioning equipment will be required, he may be interested in the program followed by our company when air conditioning our Elgin plant.

The first step followed by the plant engineer in laying out air conditioning is to coordinate the following factors with plant management:

1. Recommendations covering the plant's physical characteristics. These characteristics include: the size and shape of areas to be air conditioned, insulating qualities of the building, number of people, units of machinery, watts of light, motor horsepower, exhaust air quantities, and use of space.

2. Recommendations by the air conditioning equipment manufacturer. A complete study of the plant by equipment experts can uncover exactly what total requirements are necessary. The study should include refrigeration capacities for every thousand square feet of conditioned area devoted to office use, to light manufacturing and to heavy manufacturing. Areas where large numbers of people congregate or where layout of equipment is considerable, should receive special attention—especially if these areas are located on top floors.

When combined, these recommendations formed the nucleus of our industrial air conditioning construction program. The decision, of course, whether or not to program a long-range construction period depends upon the size, age and location of the plant. At our Lincoln, Nebraska plant, for example, we air-conditioned the entire plant—a new one—as quickly as possible. At our Elgin, Illinois plant, however, because of its size and age, we decided upon a six-year construction program.

Long range programming allows allotment of equipment and construction priorities, and permits earmarking more important administrative and production floors for early installation. Finally, by observing production results in the first areas of the building to be air-conditioned, more exact studies of other areas are possible.

Calling for a yearly expenditure of

approximately $100,000 to $115,000, the air conditioning expansion program at Elgin was undertaken in 1953 to control humidity and dust conditions in the plant's assembly, production and storage areas, and to provide year-round conditioned air to employees.

When completed in 1959, the system will consist of two 600-ton Carrier centrifugal refrigeration machines, servicing four floors in each of four interconnected buildings — a total of 332,000 sq ft. Presently, almost half of the program is completed.

Built along the Fox River in 1900, the Elgin plant is a large, brick structure, made up of four buildings, interconnected to form the letter "E". Top leg of the "E" is Building 1, the middle leg forms Building 4, and the bottom leg, Building 5. Connecting these is Building 2. See Fig. 3. All of the buildings have at least four stories, and Buildings 1 and 5 have additional levels, which house purchasing and research facilities. Over 6,500 persons work in the buildings. Behind the E-shaped group of buildings—and providing utility services to them—is the power house.

Up until 1953, only the second and fourth floors of Buildings 1 and 4, the fourth floor of Building 2, and the third floor of Building 5, were air-conditioned. As long ago as 1937, the interiors of these floors, which contain final assembly, machining and storage areas, required conditioned air to minimize dust and lint particles. The system consisted of a steam driven 200-ton Carrier centrifugal refrigeration machine and 26 central fan stations, located in the attics of each building.

Fan stations for fresh air intake were equipped with coils for heating and cooling, and pneumatic control systems. Chilled water was obtained by pumping water from two deep wells, located next to Building 4, chilling it to 44 F in the centrifugal machine, then circulating it to the fan stations. From these units, the water was returned to the refrigeration machine and turbine condensers and, after absorbing heat from the condensing refrigerant steam, was dumped as waste. As a dust control system, this network of fan stations covered an area of 132,000 sq ft.

First step in air conditioning the entire plant was to increase refrigeration capacity. This was done in 1953, when one of the 600-ton Carrier units replaced the 200-ton machine. The new machine, set in the bed of an old furnace in the power house, delivers 1200 gpm of chilled water at 42 F. To handle condensing water, a cooling tower was built behind the power house. This arrangement has allowed us to discontinue pumping from the deep wells.

At the Half-Way Mark

Immediate successive steps in the six-year program also have been completed: except for the third and fourth floors, Building 5 was air-conditioned in 1954. In 1955 all of Building 4 was air-conditioned except the third floor. Still to be completed are: installation of another 600-ton refrigeration machine in the power house (1957); air conditioning the first floor of Building 1 (1958); and completion of permanent duct work to all floors now receiving only heating and ventilating service from the system (1959).

All central fan stations installed in 1937 are presently in use. To achieve this, chilled water mains between the power house and Building 2 were installed in 1953 to meet ultimate capacity. Twelve-inch supply and return mains were laid between these buildings. A full size supply riser was carried into the attic of Building 2 from which mains were branched to the other buildings. From points in these buildings, return mains were run back to a point next to the supply riser in Building 2. From here, the return was carried to the power house. Thus, by adding relatively simple piping connections, all of the 1937 fan stations, 26 in all, were served by the new mains.

The construction program in 1954 for Building 5 serves to illustrate the general location of new fan stations and supply ducts that have been or will be completed in the other buildings. Building 5 already was partially air-conditioned — its third floor being served by the 1937 fan units. Aside from the necessity of making changeovers in fan stations and floor duct work during temperate months, we faced two other problems—priorities and lack of space.

Priorities were allotted according to departmental work functions. Because the second and third floors house the engineering department, these levels were given preference over the first and fourth floors. Still it was necessary to adequately heat and ventilate

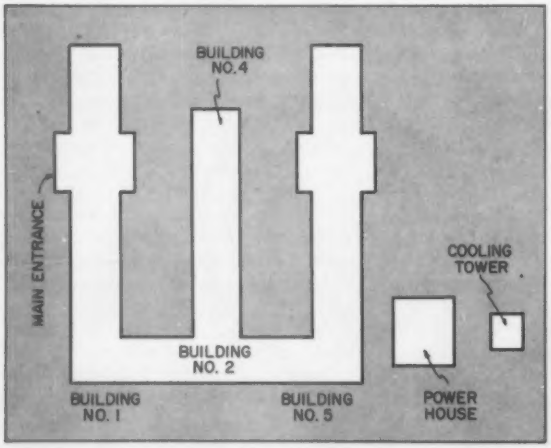


Fig. 3. The Elgin, Illinois plant, built in 1900, is made up of four buildings, interconnected to form the letter "E"

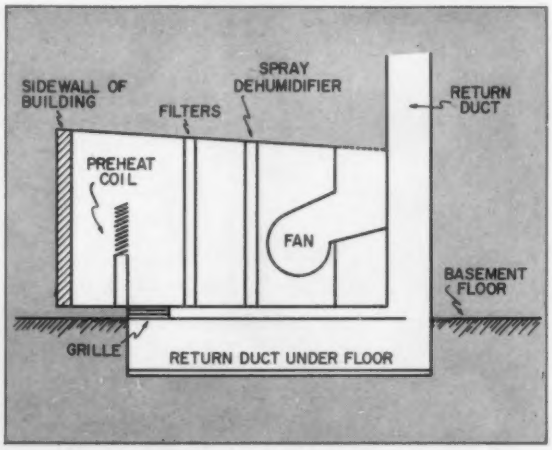


Fig. 4. Return air ducts were installed under basement floor because basement ceiling was too low to run them overhead

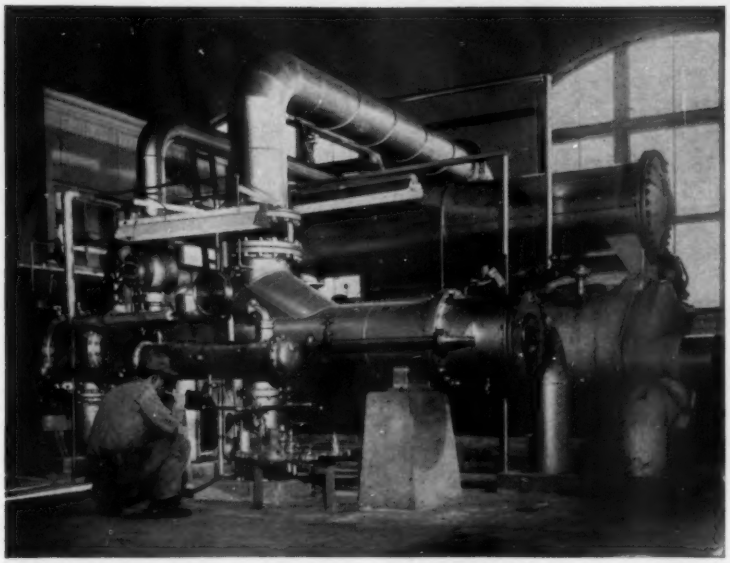


Fig. 5. This 600-ton Carrier centrifugal refrigeration machine is located in the power house. Another unit of similar capacity will be placed next to it in 1957

the first and fourth floors temporarily until chilled water was available.

Presently, until the second 600-ton refrigeration machine is installed in 1957, only the second and third floors of Building 5 are air-conditioned. The first and fourth floors will be heated and ventilated only.

The basement heating and ventilating equipment was removed from Building 5 in 1954. This equipment served the first, second and fourth floors. Replacing them were four new central fan stations to heat and ventilate the first three floors during winter, and air condition the second and third floors in summer. The attic fans formerly used for the third floor were tied into the fourth floor by new ductwork. When additional cooling capacity is provided, the basement stations will supply complete air conditioning for the first as well as the second and third floors, and the attic stations will do likewise for the fourth floor. Additional ductwork will be needed on both of these floors.

Since no space was available for the stations on the second floor, the fan stations—consisting of outside air intakes, filters, preheaters, spray and coil dehumidifiers, and supply fans—were installed in the basement, replacing the existing ventilating equipment.

However, space for the location of the new basement fan stations was at a premium. Basement ceilings were too low to run return air ducts overhead. This was solved by running the ducts down past the fan casing, under the basement floor of the station to an open metal grill located between preheat coil and filters. See Fig. 4.

Duct work is exposed on each floor and runs directly down the center of each work bay, diffusing air through side vents.

To isolate the effects of solar load, windows of all the buildings are double-seamed with permanent storm windows. Many lower panes are covered with highly reflective white paint.

Completion of the 1954 phase of the expansion program resulted in the addition of 171,000 sq ft of air-conditioned space, plus a readily available potential area of 41,000 sq ft. Basement fan units, similar to those installed in Building 5 were erected in Building 4 in 1955, boosting actual air-conditioned space in the latter building to 185,000 sq ft and potential area to 14,000 sq ft.

In 1956, the connecting structure, Building 2, will be similarly air-conditioned, thereby adding 16,000 sq ft actual and 32,000 sq ft potential air-conditioned space. By 1958, the final area, the third floor of Building 1, will be serviced, providing 22,000 sq ft more of conditioned space and another 22,000 sq ft of available area. By 1959, whatever areas that have been described as potential will be directly tied into the system, providing service to all floors of each building.

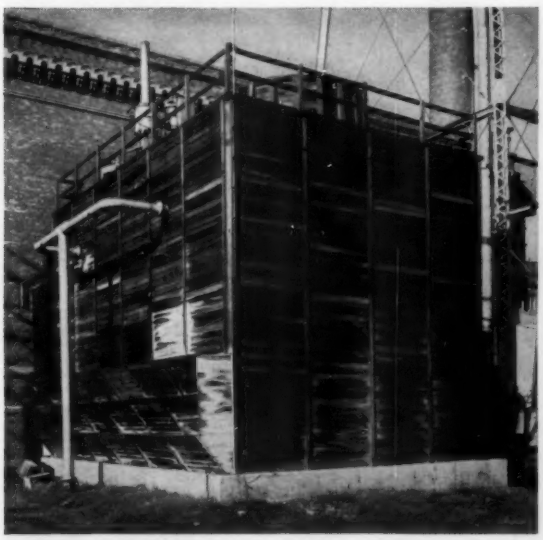


Fig. 6. Cooling tower reclaims water at 1800 gpm. Its use allowed Elgin to discontinue pumping from deep wells

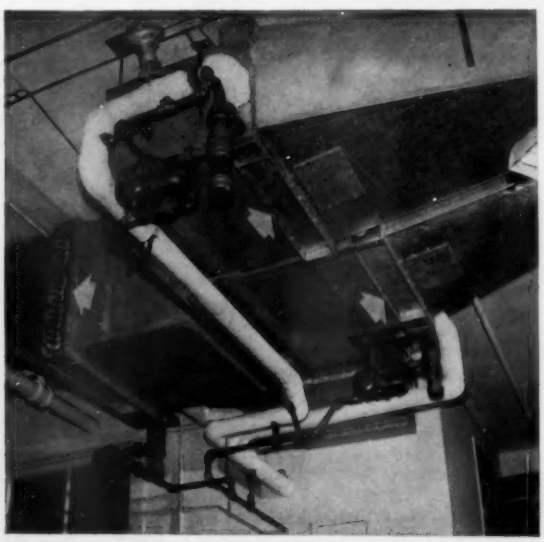


Fig. 7. Typical reheater installation in Building 5. The reheaters (arrows) are located where risers protrude from walls

Maintenance Trucks—

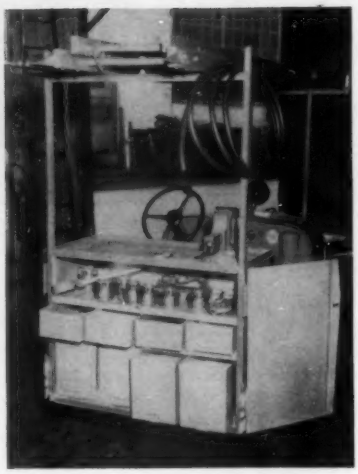
These Plants Built Their Own to Fit the Job

Traveling Tool Box Speeds Maintenance Work

THIS TRAVELING box devised by the maintenance department of Continental Motors Corporation saves dollars by speeding up repair work.

A gas-powered Clarkat towing tractor was fitted with racks, cupboards and drawers to hold practically every tool which might be used on a repair job. Simple frame welded to body of the tractor holds ladders, extra pipes and other long items. A vise is bolted to the work-table on top of cupboard and the headlight on hood serves as spotlight for dark areas. Two men can ride the machine.

Called the "buggy" by maintenance crews, the unit has eliminated two-thirds of the travel involved in getting tools to a repair job. Previously a crew would investigate the job to see what tools were required, then make one or two round trips to the tool room to gather all equipment required. Now almost all jobs are serviced in one call by the "buggy".



Combination Tool Box and Truck Cuts Maintenance Costs

By JAMES G. ARMSTEAD, Maintenance Engineer, F. C. Huyck & Sons

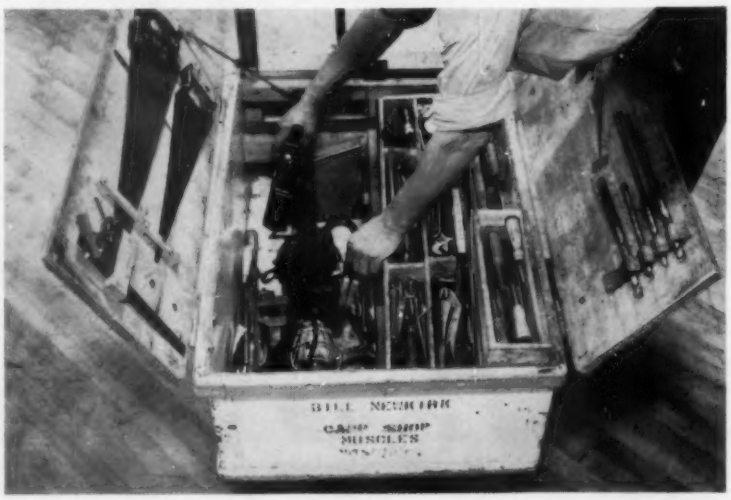
CONVENIENCE AND utility describe these combination tool boxes and trucks built by and for our carpenters. They are, furthermore, money savers for Maintenance Department.

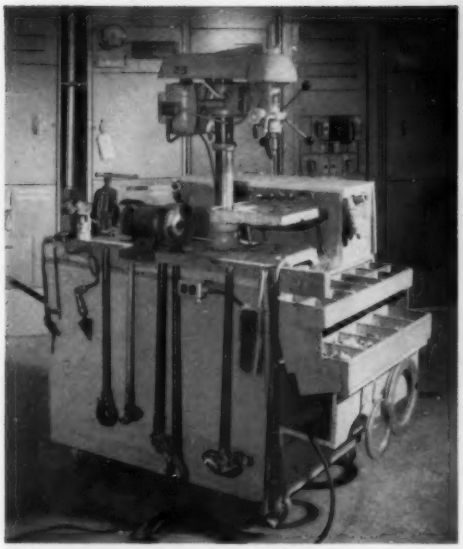
Some time ago one of our production departments abandoned several box trucks which were approximately 26 in. wide, 40 in. long and 40 in. deep. Carpenters from our maintenance department retrieved these trucks from the Salvage Department, rebuilt them into neatly arranged tool boxes, and transferred almost all their personal tools from conventional type bench tool boxes to this new storage place.

Except for the most simple tasks they now carry all of their equipment with them when they leave the shop for a job in the plant. They can carry ladders and lumber on top of the trucks.

William Newkirk, whose truck is pictured here, also built a small box which hooks onto the rear of his truck. It carries a dust pan and the base of a broom (the top of the broom being clipped to the truck handle with a friction holder). Upon completion of his job he sweeps up the debris and sawdust, deposits it in the box and later empties it into a large container.

We are pleased with the increased effectiveness and efficiency of our men. They carry with them the equipment they need and this, in itself is a time saver. I am sure we would willingly pay the cost of such trucks even if we had to start from scratch with no scrap boxes.





Portable Shop Carries Bench Drill Press and Power Tools

By ALVIN L. JOHNSON,
Plant Engineer, Litton Ind.

LITTON INDUSTRIES is a company devoted to the development and manufacture of advanced electronics and the parent company moved into its present headquarters a year and one-half ago. Their quarters consist of two brick and masonry buildings totaling 160,000 sq ft in area, mostly on one floor and separated by a 50-ft railroad right-of-way.

Since Litton Industries is a rapidly expanding organization, there is the problem of constant rearrangement and installation of new facilities such as assembly lines, machine tools, partitioning, security fences and so forth. These are usually high priority operations and very little lead time is allowed plant engineering; consequently preparation must be prompt and complete.

One of the problems encountered was dispatching the proper tools to the job. This was formerly done by the foreman who selected the tools he thought he would need and sent them to the job on a factory truck. Invariably some unexpected problem would come up that required a tool not planned for and a mechanic would have to walk to the nearest equipment room (in some cases, a half a block) to get the required tool.

We also found that we frequently needed the services of a drill press and a bench grinder which necessitated a trip to the machine shop. All of this traveling was time consuming and caused expensive interruptions to the various projects.

A study was made and several designs were submitted for a portable tool shop. We built one a year ago and it proved so successful that it has been in constant use ever since. Of course, many refinements have brought it up to its present status.

It is now a very well-equipped shop, having machine tools, portable power tools and hand tools of virtually every size and description needed to handle all maintenance and new installation except those of a major character.

The unit is a well-built chest 60 in. long, 30 in. wide and 36 in. high, mounted on four rubber tired, ball bearing casters: two fixed and two swivel. One side has an opening consisting of two doors which swing outward and are locked with a hasp and padlock. The inside face of the doors are equipped with racks and hooks to hold small tools. The interior is divided by a shelf into two equal sections. Expensive equipment such as portable power tools are kept inside. The top is made of heavy material and is used as a work bench at the job site. The entire unit, completely equipped, weighs 450 lb.

This portable "shop" is wired with a double outlet box and a 50 ft extension cord which is stored in a receptacle built onto the end. In use, it is wheeled to the job site and the cord plugged into the nearest outlet. Power is then available for the various permanent and portable tools and extension lights.

Permanently mounted on top of unit are a bench drill press, a bench grinder, a plumber's pipe vise and a machinist's vise. On the two ends and one side are brackets and hooks carrying different size pipe benders, large stocks and tap handles, bolt clippers, pipe reamers, snakes and a crowbar.

Inside is carried a ¼ in. electric drill, a ½ in. electric drill, an electric sander, various size pipe wrenches, a complete set of open end and box wrenches, Allen wrenches, various sized pliers and wire cutters, hammers, saw, chisels and almost any other variety of hand tool that would be needed on a job. On the inside of one door is mounted a block with several pairs of holes drilled into it. Each pair of holes carries a commonly used tap

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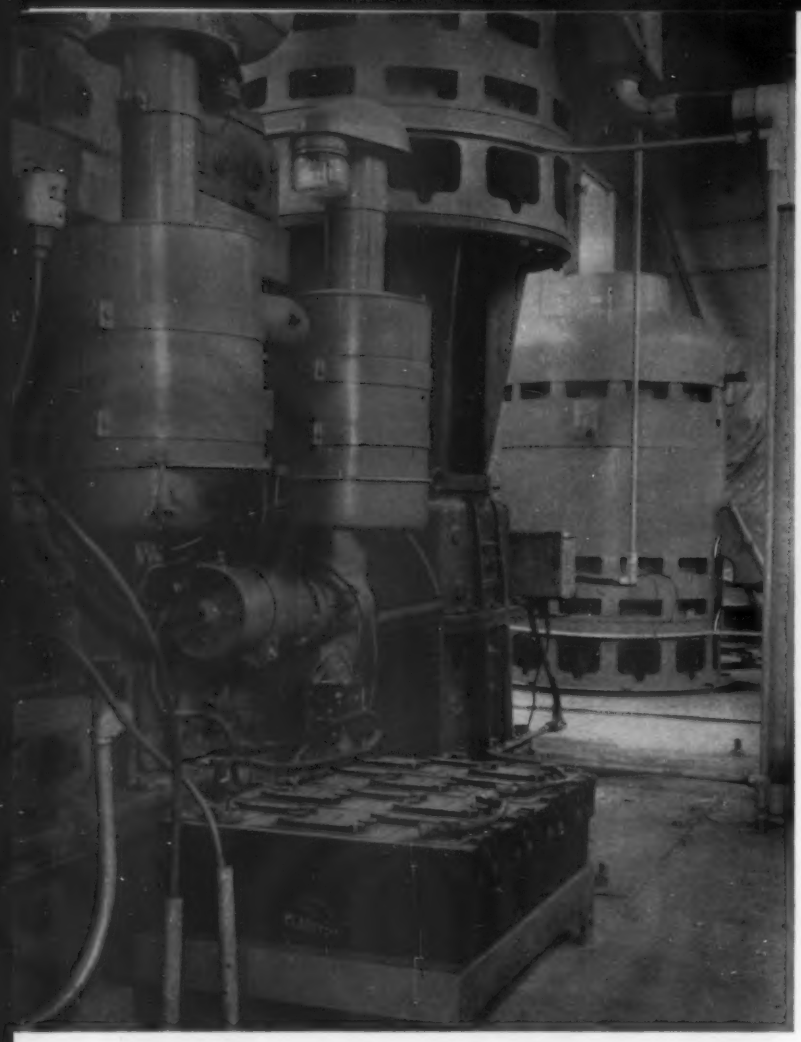

Above: Mercury switches and specially-built controls monitor pumps and engine

Left: Batteries, trickle-charged, stand ready to start up the diesel engine stand-by which is connected, by means of centrifugal clutch, to pump No. 1

Maintenance Man's Utopia:

Pump Station That Runs Itself

ONCE DAILY, a maintenance man from the Los Angeles County Flood Control District unlocks a steel door, checks oil and fuel levels, locks up again and heads for the District's next station. This "lock and key" installation is the first of some five pump facilities for the District, stations designed to run themselves.

First is Seaside pump station in Long Beach, which is both an engineering oddity and a hedge against disaster. The "lock and key" installation's primary job is to lift storm waters from a miles-square south Long Beach area, boost them over a 16-ft high levee, discharging into the Los Angeles River Flood Control Channel . . . thence by gravity-flow to the Pacific.

Ten times monthly the station's single 275 hp Buda diesel will test-run itself, monitored by Custom Built Controls, the operation recorded on a 30-day chart.

Just as automatic are the station's three deep-well turbine pumps, working a 25-ft head and rated 33,000 gpm. Floats in storm water sumps trigger Mercoid switches, powering pumps and the auxiliary diesel.

A fourth and smaller pump, with 1200 gpm capacity, works a 34-ft head, its primary function the draining of the station's deepest sump area, which lies some 37-ft below the pump house floor.

All turbine pumps are directly connected to electric motors, although pump No. 1 is also clutched to the diesel auxiliary.

Cross-sectionally, the station has two operating levels: (1) the pump-house proper, its operational floor, electric pump motors and diesel; (2) an underfloor concrete pit, reaching a maximum depth of 37-ft, its walls 16-in. thick and heavily reinforced.

Storm waters entering the 78-in. inlet (bringing water from a number of catch basins) are strained through a redwood-baffle trash barrier thence flow to the deeper underground sump. Working the sump are the three primary pumps. Take-offs from each pump's suction line feed to 36-in. diameter reinforced concrete pipe. Take-offs come at the plus-1.75-ft level. The three concrete conduits leave the pump house, climb 45-ft to the levee's top at the plus-16-ft level, and discharge into the flood control channel. The smaller sump-drainage unit has an 8-in. diameter discharge, likewise routed to the river.

Standby diesel is strategic to the

station's automatic operation, and for good reason. Logically, the station's greatest need comes during and immediately following severe storms. Yet this is precisely the time when power outages are most likely. So the diesel is coupled to one of the large, 33,000 gpm pumps. Controls assure that the engine starts up when sump levels rise and power fails.

Significantly, the diesel (rated 275 hp at 1050 rpm) can idle under no load at from 450 to 500 rpm. Ability to idle at low speed is all-important at this installation; the diesel is coupled to its pump via a centrifugal clutch. The clutch is the spring-controlled type, capable of transmitting the engine's full power at 1050 rpm. But just as important, the clutch doesn't engage until engine speed builds to between 650 to 700 rpm.

Tested 10 Times Monthly

Thus, for the 10-times a month test-runs, the engine operates independently of its pump. During most test-runs the station's sump is empty . . . or nearly so. For storm water runoffs come, in California, only during winter. Engine or pump burn-out could result should the engine-pump work a dry sump. So, for tests, and during low-sump conditions, the engine test-runs at idle, disconnected from its turbine pump.

Engineers worked overtime, adjusting the controls to handle this peculiar situation. Normally, during low-sump level, the engine test-runs itself at between 450 to 475 rpm, or perhaps 525 rpm, but never higher. Only when the engine is automatically cut-in . . . comes into emergency operation during a power failure plus high sump level . . . does the speed build to full 1050 rpm. And, as the 650 to 700 rpm point is reached, the centrifugal clutch throws in, tying engine to pump.

Five float-switch wells and their adjacent but independent Mercoid switches, trigger "power on" circuits for the four pumps and diesel engine. When the diesel's operating, its pump's electric motor is automatically "blocked-out"—and shut down.

The controller has five primary functions—all aimed at pump house automation: (1) start up engine in times of power failure and high-sump level; (2) indicate failure of engine to start by automatic controller; (3) warn of high jacket-water temperature (excess of 185 F); (4) warn of low lube oil pressure . . . if lube pressure falls below safe limit for more than 15-seconds' duration; (5) warn of engine overspeed, and shut diesel down if speed exceeds 1200 rpm.

Ten times monthly the unit automatically starts up the engine, runs it for anywhere from 1 to 30 minutes, dependent upon setting. During tests the engine idles, at a maximum 525 rpm. Run is recorded, monitored by the 30-day chart which is regulated by an electric program clock on the control panel.

Control unit, actuated by a combination of power failure, float, switch or test run, begins the cranking cycle (five positive cranks, four positive rests). Cranks and rests are adjustable between 5 and 60-seconds duration. At moment of cycling, a solenoid triggers to operation the sight feed lubricator on No. 1 pump (the pump clutched to the diesel). Another energizes the engine governor, either for full or idle. Should the engine be running test during a storm, and should a power failure combine with rising sump level, this latter emergency condition takes precedence, automatically increases speed, switches diesel from test-run condition to full speed.

Automation-wise, the turbine pumps are just as fool-proof. They're the vertical-shaft, mixed-flow, bottom-suction type, directly connected to General Electric 300 hp induction motors. The smaller sump-drain turbine is coupled to a 15 hp GE motor. All are automatically started and stopped via sump floats and Mercoid switches. The larger units maintain lube oil in "standby" condition, heated by four 1000-watt, 240-volt strip heaters. The smaller has two 150-watt heaters.

Even the diesel engine's 1000 gal fuel tank can be filled without the pump house being unlocked: tank is housed underground, along the station's east wall, the fill pipe accessible from the outside. In addition, the diesel is rigged to a gravity-operated shutter. When the engine starts up, air pressure from its radiator automatically opens the shutter blades. When engine stops, shutters close.

Both in theory and practice, about all maintenance men need do is visit each station once a month, change the controller's 30-day chart, check lube oil and diesel oil tanks, sweep the station's floor, and the installation is back on full-time automation.

Idleness Causes Trouble

Automatic operation was all but forced upon designers because of the number of projected stations and, more importantly, because for a goodly portion of the year (perhaps 8 months out of the 12), neither pumps nor standby diesel will be operating. Still, it's this very condition of idleness which can beget maintenance headaches. That's the primary reason why the diesel engine is so rigidly controlled, why it test-runs itself for as long as five hours monthly.

Subsequent pump stations, now on the Flood Control District's drawing boards, will anticipate maintenance shortcuts even more: most crucial

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This photograph, taken during installation, shows gear box, clutch for pump

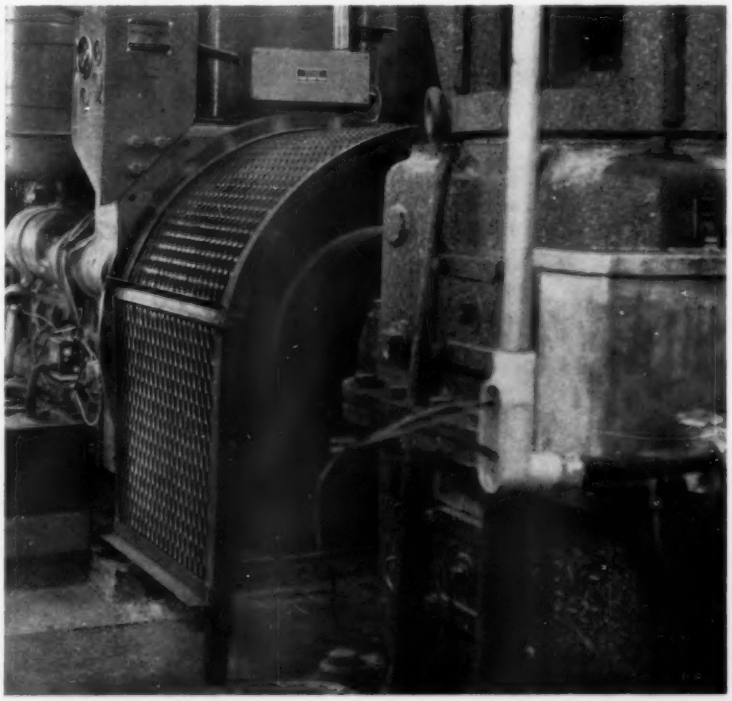


Fig. 1. Acoustical panels in shoulder booth help reduce mill noise interference

Communications in a Mill

System Gets Important Messages Across Despite Noises

By G. F. LANGOHR, General Plant Engineering Dept., Johns-Manville Corp., Manville, N. J.

THE MAJOR DIFFICULTY in providing intercommunications for an industrial plant lies in picking the proper type among the many kinds of systems available on the market. The choice is wide and can vary from the simplest arrangements of bell, horn or light signals to the most elaborate of electronic paging and amplified voice coverage. The final selection is usually dictated by any peculiar requirements of the production process, the physical set-up of the building, and the limitations imposed by cost.

The Johns-Manville Corporation had such a problem of selection for its new twelve story asbestos mill at the Jeffrey Mine in Asbestos, Quebec. The decision was to use a private automatic dial telephone system. Although the basic equipment is conventional, some of the application difficulties and the unusual modifications found necessary, are interesting.

The problems facing the engineers of our Fiber Division were: First, to select a system which would be as fully intercommunicating as possible, but still keep within definite cost limits. Next, were the physical facts of large and sparsely populated floor areas and the high background sound levels produced by the many pieces of production equipment used in the asbestos extraction process. In addition, the equipment chosen had to be simple, rugged, relatively unaffected by vibration, and not too susceptible to moderate amounts of dust.

The process of liberating asbestos fiber from its ore is simply a series of crushing, screening and aspirating steps where the freed fiber is separated by air suction from a mixture of crushed rock particles, fiber, and rock dust. Large ore tonnages are handled, rated capacity being 600 tons per hour. Therefore, the flow of material is mostly by gravity from the eleventh floor of the building, where the rock enters, to the first floor where the cleaned fiber is packed. The process flow lines are essentially vertical. The mill operator on a typical floor must serve a horizontal slice through a number of vertical lines spread over an area of roughly 80,000 sq ft. Thus, he must range over wide areas. If he always could be reached at one convenient spot, the communications problem would have been simpler.

Preliminary sound measurements taken in the original wooden mills showed levels up to 100 decibels over wide areas. Low frequencies predominated, but it was evident that if a voice amplification system was picked for the new mill, a great number of individual loud speakers would be needed to ensure intelligibility. Tests made later in the new building, which is of steel and concrete construction, confirmed the earlier measurements. Levels were up to 107 decibels. Low frequencies again were to the fore, but there were

bands of significant output up to 4000 cycles per second.

Our Division engineers first considered a conventional wired electronic sound system with amplified voice paging and call-back features. This was to consist of a few master stations to each of which would be wired a series of remote call-back stations. Although the masters could communicate freely among themselves, the remote stations would be limited to talking back and forth only in their own particular chains. To make the system freely intercommunicating at all levels would have meant making every station a master. It became apparent that costs would be prohibitive and that solution was discarded.

After careful study of the production lines, and where people would be located in the building, a scheme was then developed by our engineers which took advantage of the relative inexpensiveness and flexibility of standard commercial telephone equipment. The specifications called for a private automatic dial telephone system as the central element. But this was to have special modifications and auxiliaries.

The result was a system which would allow: free communications at all levels, paging and personnel locating, and, very important, the broadcasting of mill operating instructions, alarms, and information.

Fig. 2. Code call unit is located above the enclosure housing the switchboard

The equipment and system was designed and built by National Sound Services, Ltd. of Montreal. Most of the components, such as the switchboard and telephones, were manufactured by the British General Electric Company.

The central unit is a 50 line private automatic telephone exchange (Fig. 2) wired for 47 dial telephone circuits. Supplementing this is a specially designed code call unit which permits up to 36 paging and 125 mill operating codes to be broadcast automatically throughout the building by dialing from any telephone location. Telephone "rings" and code signals are sounded over a number of electrically operated horns distributed over the floors. A call to a local telephone is announced only by the horns on that particular floor. These sound the characteristic "ring". Paging and mill operating signals. however, are sounded on all the horns in the system.

Half the mill is now built and in operation; the second half is under construction. For the first half, the exchange was equipped for thirty telephone extensions and three simultaneous conversation paths. Thirty-two local and extension telephones were spotted at key points. See Fig. 3. The

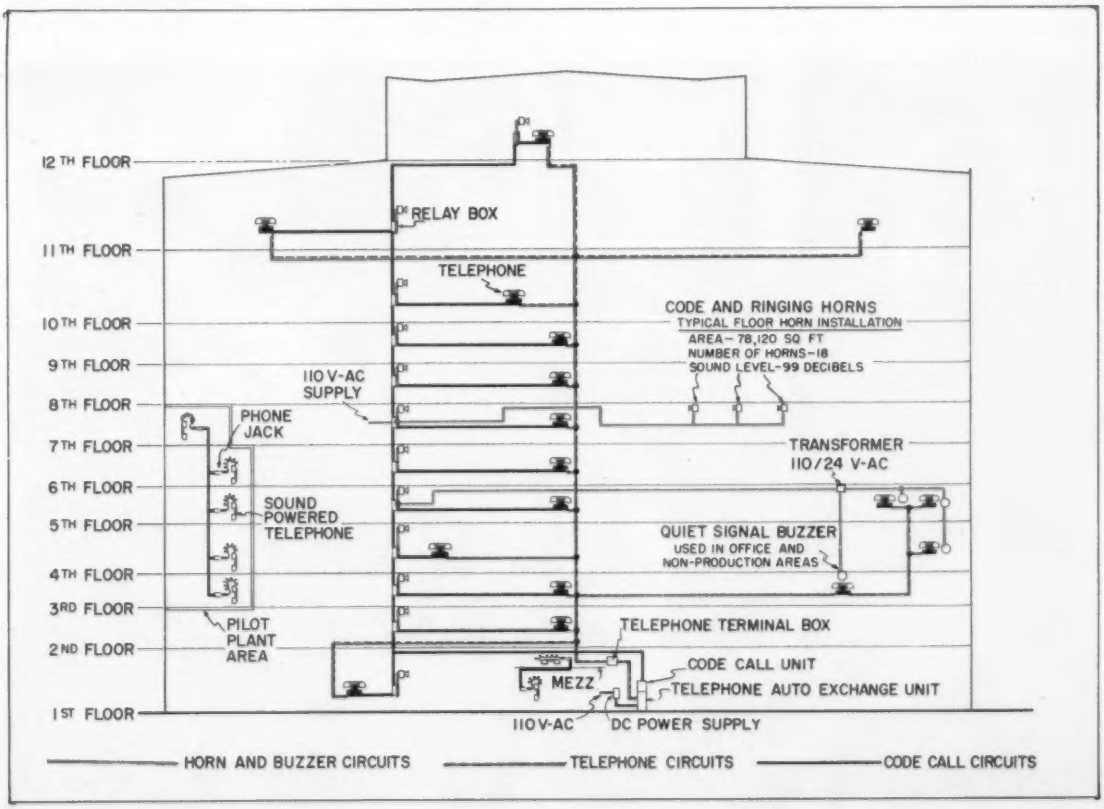


Fig. 3. Cross-section of mill gives general idea of ways the intercommunication system ties together operating areas

allowance generally is one phone per floor for use by the mill operators, and with others scattered for maintenance and supervisory personnel. The system extends outside the building itself for considerable distances to telephones placed at various ore supply points, and in the old mills, and the mill's main office. The total eventually will be 49 telephones, with 36 of these as separate locals and the remainder as extensions. The exchange switchboard capacity will be increased to handle five simultaneous calls.

Station to station calls are made in the usual manner by dialing one of a series of two digit numbers. The familiar ring of the called telephone would, of course, be inaudible in a "local" area as great as 80,000 sq ft, so the ringing current is transmitted to an associated relay cabinet, Fig. 3. Here a relay picks up and follows the characteristic ringing pulses and repeats them through the horns on that particular floor.

The telephones are used also to send out code signals. These are initiated by dialing a two-digit "access" number which sets up the code call unit. The desired code signal is then dialed. The dial pulses are picked up automatically in the code call unit and transmitted to every one of the relay cabinets in the system. In each, a second relay, other than the one used for "local" calling, picks up and sounds its own particular group of horns. The result is a broadcast of the code signal over all horns throughout the building which continues until the sender hangs up his telephone. The horn sounds are in pulses corresponding to the dialed number. For example, 24 would be two pulses and a pause, followed by four pulses and so on. The time of one code cycle depends on the particular number being sent and whether it is two or three digit. As an illustration, sending 24 takes 7 seconds, with one second for each pulse and another for the space between 2 and 4. A waiting time of 8 pulses, or 8 seconds, follows before the signal is repeated.

Fig. 4. Type of horn selected for use

As mentioned before, these code signals have two uses. The first is for personnel paging and locating. Two digit numbers are assigned for this. The paged person, on hearing his own code, picks up the nearest telephone, dials an answering number, 29, and is connected to the calling party.

The second, and more unusual, use is to transmit mill operating signals. A series of three digit codes has been set up to announce different production contingencies, such as starting up and shutting down, failure of a process line or trouble at key equipment. Thus it is possible to blanket the entire mill with clear and unmistakable operating instructions or trouble warnings from any point in the building or from other key locations outside. These operating signals, of course, have automatic priority and the code call unit is arranged to step in and cut short any local telephone ring or paging call that might be sounding on the horns.

Although the code call unit can produce up to 36 paging and 125 mill operating signals, all of these will never be used. Only 52 different mill

Fig. 5. Shoulder booth is located close to processing equipment. Fiber screen is to right of column in foreground

signals are in use. This number is ample for production purposes and there is no confusion between individual signals. Only 21 paging codes have been assigned.

It was planned originally to have certain mill signals broadcast automatically in lieu of having them dialed manually. The milling operation is divided into a number of parallel lines. All motor starters in one line are electrically interlocked. For example, if the fiberizer on the second floor fails, all the equipment ahead of it will shut down (in sequence) back to the feeder delivering ore from the bins on the tenth floor. Obviously, this same interlocking could also be used to operate the code call unit directly and thus automatically announce the failure and location of that particular line. But after careful consideration that feature was deferred. However, it still can be added later by supplementing the code call unit.

The horn system is an important and expensive part of the installation. The total floor area covered is extensive, about 1,000,000 sq ft, and the background sound levels are high. It was felt that, to give even coverage and intelligibility, it would be better to use a large number of small horns instead of a few high powered units, even though that choice meant higher wiring costs. Since the horns were to sound codes, sharp cut-off and clear definition of the individual pulses was essential. The kind of horn selected (Fig. 4) has proved quite effective on that score.

Survey During Production

Based on the sound measurements taken in our old mills, it was predicted that about 400 horns would be needed to cover the new building. Fortunately, before ordering that many horns, we were able to make a survey with production in full swing. The method of surveying was simple. Two horns, rigged with long connection leads, were carried from floor to floor and plugged in and sounded at different spots until some informed guesses about coverage could be made.

The result was that only 139 horns were allowed for the first half of the building. Even that number proved too liberal, for some 20 horns have since been taken out. The final design calls for 186 horns in the entire building. The greatest concentration is 25 on a single floor.

Some details of the installation methods and wiring may be of interest. The exchange switchboard and the equipment in the relay cabinets are quite sensitive to small amounts of dust and dirt. Although the switchboard has its own dust-proofed enclosure, it was given extra protection by building a special small room to house it, Fig. 2. This room is sealed against dust as completely as practical. In addition the interior is pressurized by a fan. The relay cabinets are carefully gasketed and bolted and particular attention was paid to the methods bringing in and sealing-off the conduits containing interconnecting wiring.

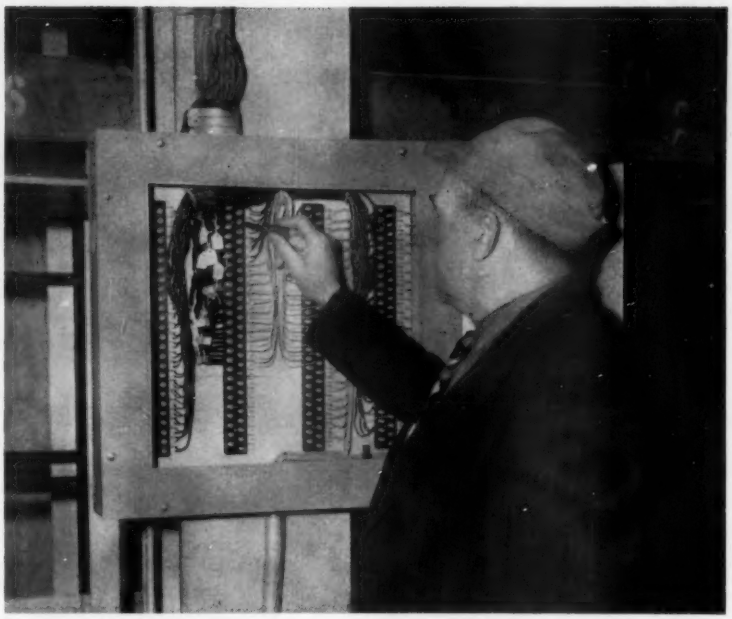


Fig. 6. Typical terminal cabinet. Neoprene jacketed wires are twisted into pairs

The 48 volt d-c wiring for telephone circuits and risers was done with neoprene jacketed twisted pairs. The neoprene jacketing will take abuse enough not to warrant the extra protection of steel conduit.

The horns are supplied at 110 volts a-c from lighting panels. Because of the considerable length of circuiting needed, this wiring was done with inexpensive flat aluminum sheathed 2 conductor No. 14 rubber-insulated cables. The flexibility and easy installation of this type of cable may be observed in Fig. 4, in contrast to the heavier installation of rigid conduit running down the same column.

Telephones located in noisy areas are mounted in special shoulder booths lined with Johns-Manville Transite acoustical panels, Fig. 1. These panels are an asbestos-cement board, 3/16 in. thick and perforated at ½ in. centers with 3/16 in. holes. This simple design, copied from one used in our old mills, is surprisingly effective, even where the telephone is located right next to noisy equipment.

The major part of the installation has been in operation for over a year and experience with it has been very satisfactory. The code signals are clear and can be understood easily. The system is quite flexible and changes or expansions can be made at relatively low cots.

Timers had to be provided for some of the operating floor phones, to allow the operator to dial a code signal and then hang up immediately instead of waiting. The timer sustains the code call for a predetermined period after the hand set is replaced and thus releases the operator for other duties.

The initial allotment of only three links or talking channels in the switchboard soon proved inadequate; occasional blockages resulted. Five links, allowing the same number of simultaneous conversations, are now provided.

Changes in the number and location of telephones were very few. But, as mentioned before, it was necessary to reduce the number of horns.

The main intercommunications system is supplemented by two small isolated sound-powered telephone installations. These are illustrated schematically in Fig. 3 and consist of jack connected portable telephones, indicating lights and interconnecting circuits. The first covers our pilot plant and allows phones to be plugged in at will between different floors and the various pieces of equipment used in the development work. The second installation is used for maintenance of pressure packers. The packers and their hydraulic control units are on different floors. One telephone circuit with jacks at either end, connects each group of three packers with its hydraulic units.

Abrasive Wheels

Select the One to Fit Your Job

By OSCAR MORVAI, Ind. Engineer, McClellan Air Force Base

SINCE ABRASIVES fall under the classification of expendable tools, their cost is often considered a fixed item, and no attempt is made to reduce it. Many companies use a large volume of abrasives without close supervision over their use and application, and this practice almost inevitably results in waste and unwarranted costs.

The only real test of any abrasive is its overall efficiency on the application for which it is being considered. The "best" abrasive yields the desired results at the least overall cost.

In the selection of an economical grinding wheel, two points must be considered: the quantity of metal removed in a given time; the wear induced upon the abrasive wheel during that time.

One wheel may have a life of three times that of another wheel. In other cases, a wheel may remove twice as much metal but will use a large amount of abrasive to accomplish it. Therefore, there is an economical point where the abrasive consumption and the rate of metal removed will yield the most return for a given wheel having the proper combination of grain type, grain size, hardness, structure and bond. It follows, therefore, that an infinite number of combinations are available.

How, then, can the correct wheel be selected to do a given job? Most companies start by accepting the recommendations of the vendor and their abrasives engineers. This establishes a base from which the selector can proceed. In many cases a wide range of grit, grain, hardness structure and bond combinations will be recommended, particularly where the work varies from the usual type. For a given equipment, type of work and other conditions which occur regularly, a definite wheel will probably be suggested, with good results.

A typical service test was run in a plant faced with the problem of finding the most economical abrasive cup wheel for edge preparation of armor plate prior to welding. Because of high volume production, about $700.00 was spent each month for abrasives in this one application alone. With several wheels apparently doing the job well, as reported by shop foremen, the problem was to select the most desirable of the wheels to be used on the existing portable hand air grinders.

The following test was designed to meet the needs of the operation:

a. Conditions were not altered anywhere along the test to meet an ideal situation. All tests were to be performed with the same equipment as that currently in use. All other variables were to be kept constant so that they would not affect the outcome of the test. For example, the same operator was assigned to the task of grinding the sample pieces of metal, and he was instructed to perform the operations with no variations.

b. Delivered air pressure to each tool was measured prior to the run, with a needle type pressure gage. This gage uses a hollow hypodermic needle which is inserted directly into the air hose near the tool. Air pressure was held constant for all runs.

c. The grinder was set for 4500 rpm, and was checked before each test run.

d. Each specimen of armor plate

(Continued on page 196)

Table 1. This summarizes test results on five abrasive wheel samples. Wheel 5, indicated in color, is most economical

Test Number Type	1 A20-R3-B	2 A16-R3-B	3 22A16-R3-B	4 7A24-P7-B1	5 C3A20-3P-87N	Derivation (Item Nos.)
1. Wt of specimen (gms) Start	1028.4	1114.5	1100.6	1122.4	1031.2	
Finish	1001.1	1088.6	1065.5	1083.1	975.7	
Metal removed (gms)	27.3	25.9	35.1	39.3	55.5	
2. Metal removed per hr (gms)	327.6	310.8	421.2	471.6	666.0	
3. Wt of wheel (gms) Start	1682.8	1690.8	1739.0	1546.8	1950.5	
Finish	1671.1	1686.1	1732.2	1537.6	1941.0	
Wt of wheel used (gms)	11.7	4.7	6.8	9.2	9.5	
4. Wt of wheel used per hr	140.4	56.4	81.6	110.4	114.0	
5. Metal removed per gm of wheel	2.333	5.511	5.162	4.272	5.842	2 ÷ 4
6. Total available for grinding if 50% of wheel is usable	841.4	845.4	869.5	773.4	975.2	
7. Rpm of grinder	4425.	4250.	4100.	4325.	4300.	
8. Wheel life (hours)	5.99	14.99	10.66	7.01	8.55	6 ÷ 4
9. Total wt of metal removed per wheel (gms)	1962.	4658.	4488.	3303.	5697.	2 × 8
10. Wt of wheel used per 100 gms of metal removed (gms)	42.86	18.15	19.37	23.41	17.11	3 ÷ 1 × 100
11. Cost of labor and burden ($4.00/hr) per 100 gms metal removed	$1.220	$1.287	$ .950	$ .848	$ .601	10 ÷ 4 × $4.00
12. Cost of wheel	3.43	3.43	4.27	4.36	4.27	
13. Wheel cost per hr of life	0.57	0.23	0.40	0.62	0.50	12 ÷ 8
14. Wheel cost per 100 gms of metal removed	0.146	0.074	0.095	0.132	0.075	12 ÷ 6 × 10
15. Burden	1.220	1.287	.950	0.848	0.601	11
16. Total cost per 100 gms of metal removed	$1.366	$1.361	$1.045	$ .980	$ .676	14 + 15

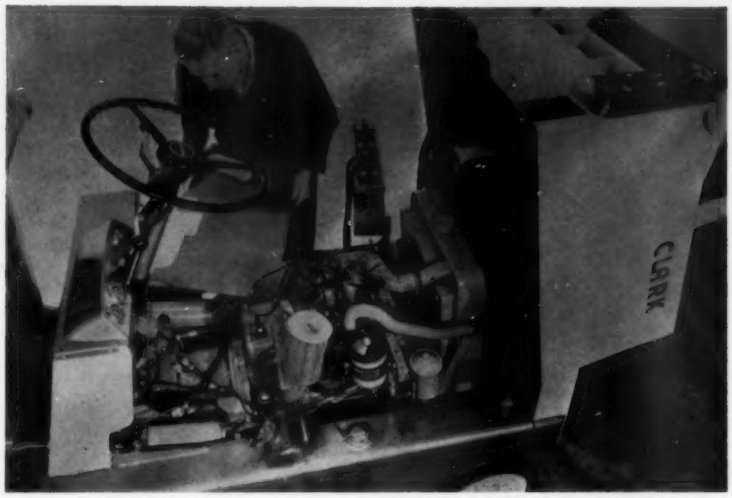


Fig. 1. Gasoline-powered fork lift truck "opened up" for inspection and maintenance. Hood swings up for easy access to engine, battery mounted on metal tray swings out to one side, and floor plate is readily removable to service transmission and torque converter

Truck Maintenance Gets a Lift

New Models Designed for Ease of Inspection and Repair

AT LEAST TWO exhibitors at the Materials Handling Institute Exposition, to be held in Cleveland June 5-8, will introduce product lines that were designed with the plant engineer in mind. For, as a recent PLANT ENGINEERING study showed, the plant engineering department wields strong influence in the choice of industrial trucks, with ease of maintenance ranking uppermost as the basis for preference. These two new lines of trucks are designed for accessibility and service to the nth degree.

Emphasis on these maintenance "musts" is reflected in the Clarklift line of fork trucks, being introduced by the Clark Equipment Company. Most obvious of the features is the one-piece swing-up hood. For checking and servicing the engine, this hood swings up out of the way, exposing the entire engine to the mechanic. The battery, too, gets involved—installed in a tray mounted on a single post, it will swing completely out of the way for servicing the engine.

For access to the transmission and its immediate surroundings, the entire floorplate will lift off, after removal of only four bolts.

One of the major maintenance characteristics of the line is the degree of interchangeability of parts. Transmission, torque converter, steering column and handwheel, hydraulic control valves, wiring harness and leads are all interchangeable within the entire line of trucks.

Self-adjusting brakes promise to be a boon to the plant engineer. A device on the brakes automatically maintains correct clearance between lining and drum during the life of the linings. When the linings have worn to the point where they should be replaced, the self-adjusting action stops, and the truck operator gets a "soft" pedal, indicating the need for brake relining.

Equipped with a "Breakaway" feature for easy maintenance, a new Worksaver pallet truck will be introduced by the Yale & Towne Manufacturing Company.

This breakaway action, according to the designers, makes maintenance as simple as the operation of the truck. Removal of two pins, one on each side of the truck, permits the whole front of the truck to open away from the battery compartment — making every hydraulic and mechanical unit immediately accessible for service.

Also, without any disassembly of the truck, the hoist motor can be pivoted forward into the battery compartment for ease of cleaning and brush renewal.

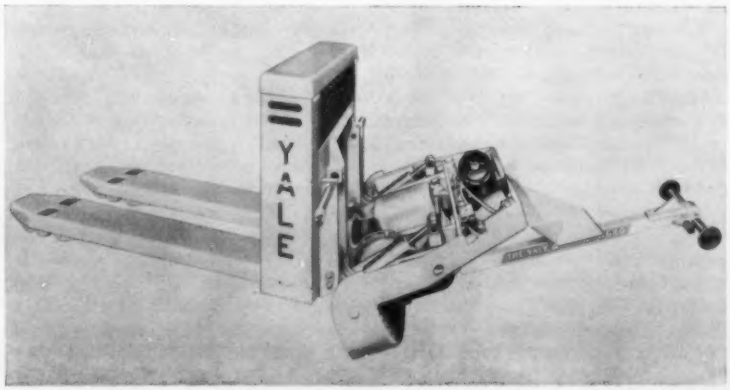


Fig. 2. Battery-powered pallet truck in position for service or inspection, after "breakaway" pins have been removed. All hydraulic and mechanical equipment and controls are accessible for service. Hoist motor can also be swung out for brush inspection and cleaning

Paint Tips For Plant Engineers

This article deals with paint technology. . . It discusses characteristic components of typical paints and tells what each of these is supposed to do

By DAVID KUT, Mechanical Engineer, and S. KUT, Pearl Varnish Co., Ltd.

PAINT MAY BE DEFINED as an intimate mixture of pigment with a film-forming material, such as a drying oil (e.g. linseed oil, china wood oil). All film-forming materials, on the nature of which the properties of the paint largely depend, either have, or can readily achieve, complex chemical structures.

In describing the typical and main components of a paint, a simple oil paint will be discussed. The principal constituents of such a paint are drying oils, driers, pigments, fillers or extenders and thinners.

The oils used are of vegetable origin, the two most important ones being linseed oil and china wood oil, (the latter also known as tung oil). The raw oil, obtained from the seeds by a process of pressing, is refined, and may then be further processed to form oils having differing physical properties, particularly with regard to drying time, each processed oil finding applications in particular paint products. For example, the oils may be heated (prior to use in paint manufacture) to form thickened and more complex drying oils, which have certain desirable properties not present in raw oil.

When a thin film of a drying oil, such as linseed oil, is allowed to dry in air, it will, after a few days, form a very soft film which hardens very slowly. These drying oils do not in themselves possess sufficient complexity to form satisfactory, strong, tenacious and protective films, but on exposure in thin films to the air, the oils absorb oxygen and gradually form hard, transparent resinous films. The oxidation process, and the subsequent chemical reactions, which convert the drying oils into film-forming materials are very complicated.

Fortunately, the slow process of oxidation from the liquid oil film to the hard resinous film can be speeded up by the addition of driers. These accelerate the drying process by increasing the rate both of the absorption of oxygen, the oxidation process, and the further subsequent chemical reactions, resulting in the necessary increase of complexity of the oil molecules to form a satisfactory film.

Driers

The most common driers are organic compounds of cobalt, lead and manganese. They are added to the paint in very small proportions. The addition of too small an amount of a drier will lead to a longer drying time. The addition of too large a quantity is avoided, since this may result in certain film defects, such as wrinkling, and to reduced durability of the paint. The oil normally used in oil paints is linseed oil, which is obtained from flax seeds.

The pigments are finely divided opaque solids conferring on the paint color, and decorative effect, strength and protective properties. Due to their opaqueness, they obscure the underlying surface. The film-forming materials alone, such as the drying oils are transparent and a surface coated with them would be clearly visible (as is observed when applying a coat of clear varnish).

Some examples of common pigments are titanium dioxide, zinc oxide, white lead, and lithopone. These are "all-white" pigments. Yellow pigments are largely chromates of lead. Red and brown pigments are naturally or artificially prepared iron oxides and iron oxide derivatives. Other common pigments are prussian blue (a complex potassium ferrocyanide) and carbon black (from vegetable, mineral or animal origin). In addition to these mineral colors, a large number of synthetic organic pigments are used in paint manufacture.

In contrast to the pigments, extenders or fillers have little or no opacity and coloring power, being almost transparent when dispersed in drying oils. They are included in paints for certain purposes, such as to give body to the paint, to cheapen it by adding to its bulk, to adjust the flow of the paint, to prevent settlement of the pigments, and so forth. Common extenders are barytes (barium sulphate), china clay (aluminum silicate) and whiting (calcium carbonate).

Thinners reduce the consistency of the mixture of oils or other film-forming material and pigments, so that the paint can be readily applied by brush-

ing, spraying, dipping or other methods of application. The particular thinners used depend on the composition of the paint, for they must be compatible with the film-forming material on which the paint is based, and on the specified manner of paint application. Thus, in a "brushing" paint a more slowly evaporating solvent (i.e. thinner) would be used than with "spraying" paint. The most common thinner used with decorative paints until recently was turpentine, which is manufactured by the steam distillation of the resinous sap exuding from pine and other trees. However, due to its rather high cost, turpentine has been replaced to a large extent by white spirit (a high petrol fraction). Other solvents in general use are toluol, zylol, naphtha and esters (for cellulose finishes).

Final Product Preparation

The manufacturing procedure varies for different paints, but generally the oil or other film-forming material, pigments and extenders are well mixed by mechanical means into a paste. This is then "ground" in paint mills, to form intimate contact between the pigments, extenders and the film forming material. "Grinding" is a most important stage in the manufacture of a paint. If not carried out in a proper manner, it can lead to an inferior product, even if high quality raw materials have been processed. Addition of driers and thinners to the "ground" paint then produces the final paint product.

An oil paint, having a base of treated linseed oil, does not produce a paint film sufficiently glossy and hard for many purposes. The linseed oil, or other oils, are therefore modified by blending them with natural or synthetic resins to form varnishes. The natural resins commonly used, such as rosin and copal, are natural exudations from trees. The resins when deposited from a solvent, form hard, glossy and brittle films. Varnishes, and paints prepared from varnishes, dry more quickly and have more gloss and hardness than those based on unmodified vegetable oils. Though natural resins are still extensively used, they have in the last decade given way for many applications to synthetic resins. Synthetic resins, unlike the natural resins, can be manufactured to a constant rigid specification, and confer many desirable properties on the paint.

The synthetic resins most commonly used are phenol-formaldehyde resins and the alkyds (also known as oil modified glyptal resins). The latter type of resin is today the base for high class, quick-drying synthetic enamels of high durability. In addition to the above two classes of resins, there is a vast and ever growing array of other synthetic resins. They find use in particular applications on account of certain special properties they possess, such as heat resistance and resistance to certain chemicals or solvents. They also give a very high degree of flexibility. The oil component in varnishes and paints based on vegetable oil modified with natural or synthetic resins dry like the simple unmodified oil, by oxidation, thus forming even more complex resilient and protective films.

One way of accelerating chemical reactions and therefore the air-drying and subsequent hardening of paints is by the application of heat. In one method, the coated articles are force-dried at a relatively low temperature. A more common industrial practice is to place the articles, coated with baking paint for a certain specified time in a heating chamber at an elevated temperature (e.g. 200-300 F). By means of this process, dry and hard coatings are rapidly obtained. Some of these baking paints are essentially the same as the air-drying synthetics, whereas others are specially formulated for baking in order to impart to the paint coatings special properties. These may be exceptional hardness, marproofness, and resistance to chemicals or fruit juices.

"There goes that chatter complaint in the machine department!"

Film Formation

In contrast to the vegetable drying oils, there are materials which in themselves possess sufficiently complex structures to form satisfactory films, without any further oxidation. Such solvent type finishes are solutions of film-forming agents and their modifiers. They deposit a satisfactory film merely by evaporation of the solvent, without any oxidation or other chemical reactions subsequent to the deposition of the film. For this type of finish, the final film formation is therefore only a physical process, i.e. deposition of the film by evaporation of the solvent. Many synthetic resins fall within this field such as polystyrene, polymethacrylates, chlorinated rubber, and so on, but the most commonly used film-forming agent of this type is nitrocellulose.

Nitro-cellulose is readily soluble in a wide range of solvents and when deposited from these forms a film which, however, is unsatisfactory and brittle. Nitro-cellulose is therefore modified with plasticisers and resins. By the addition of sufficient plasticisers (organic liquids or soft solids of low vapor pressure), nitro-cellulose forms smooth and flexible films. The resins, synthetic and natural, confer increased gloss and adhesion to the cellulose lacquer. The proportions and type of nitro-cellulose, resins, plasticisers and solvents have all to be carefully balanced to obtain a fault-free cellulose lacquer.

Cellulose lacquers, used as transparent or pigmented lacquers, having a rapid drying time (on the average in the order of 20 min.) form hard, tough and resistant surfaces. They are usually applied by spraying, but may also be formulated for brush or dipping application. Cellulose lacquers are highly inflammable, and special precautions have to be observed in their storage and use. Their coatings are also highly inflammable (flames rapidly spreading). However, some fire retardancy can be conferred on them by special formulation.

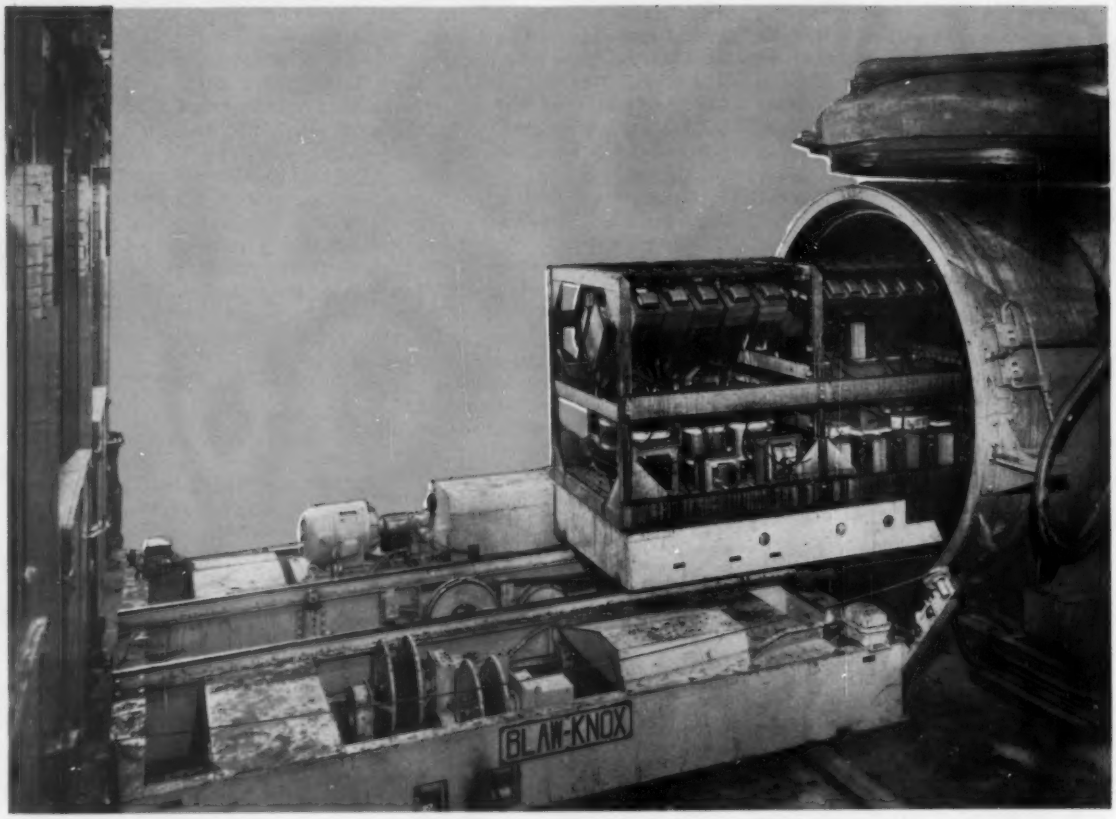


Fig. 1. Transformers are removed from impregnator, where they received varnish treatment, on specially built car

Six-Way Buggy Takes Transformers for a Ride

Fig. 2. With varnish pumped out of impregnator, car is ready to pick up load

AN AUTOMATIC batch system for impregnating transformers with varnish is in operation at a General Electric Company Specialty Transformer Plant, Fort Wayne, Ind.

Key to the operation is a remote-controlled, driverless car, designed and built by the equipment division of Blaw-Knox Company, which loads, discharges and transfers racks of transformers through several stages.

Electrically controlled, the car and carriage arrangement is 12 ft wide and 10 ft 8 in. long, and weighs 20,000 lb It will carry a load of 12,000 lb at the rate of one-half foot per second.

After the transformers are loaded on pallets by workmen using electric hoists, the car picks up a pallet and transfers it to a preheat oven. To complete the cycle, the car transfers the pallet of transformers from the preheat oven to the varnish impregnator.

All car and carriage motion results from three hydraulic motors which are powered by a 5 hp electric motor connected to the hydraulic pump.

In order for the car to transfer the material through the system, it must have six-directional motion: up and down, for picking up and setting down loads; forward and backward to position loads in front of racks, ovens or the impregnator; and a cross action which permits loads to be moved into or out of this equipment.

Each of the three ovens, the impregnator and rack stands have built-in rail runways for the carriage. A gap of two feet between the rails on the car and rails in the racks and processing units is bridged by the wheel arrangement on the carriage. Four sets of trucks under the carriage keep it in balance at all times, even when one set of wheels is off the rails during transfer.

As a safety feature, the car is equipped front and rear with waist-high cables which stop car and carriage motion when they come into contact with any object.

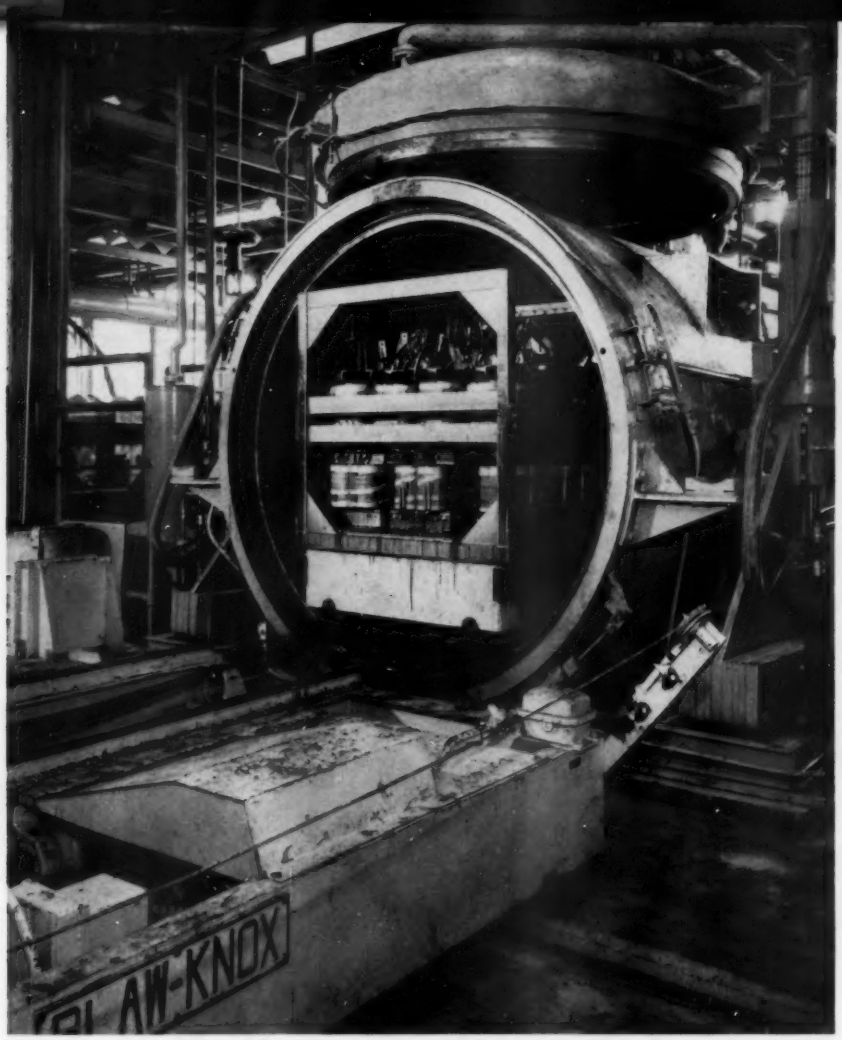


Fig. 3. The transfer carriage has now engaged the load of transformers in the impregnator

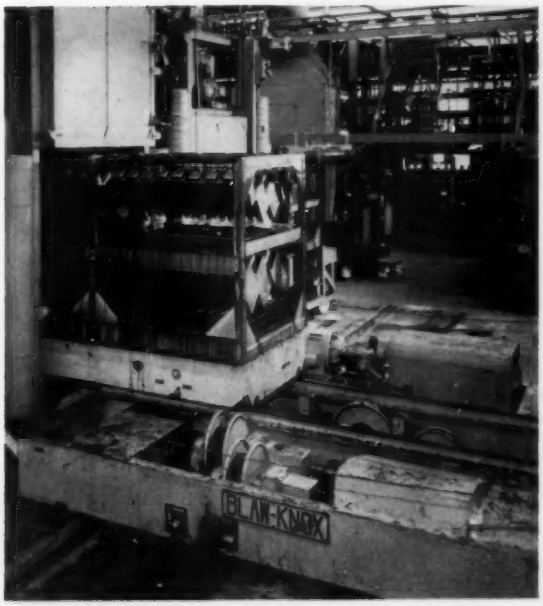


Fig. 4. Carriage automatically returns to original position

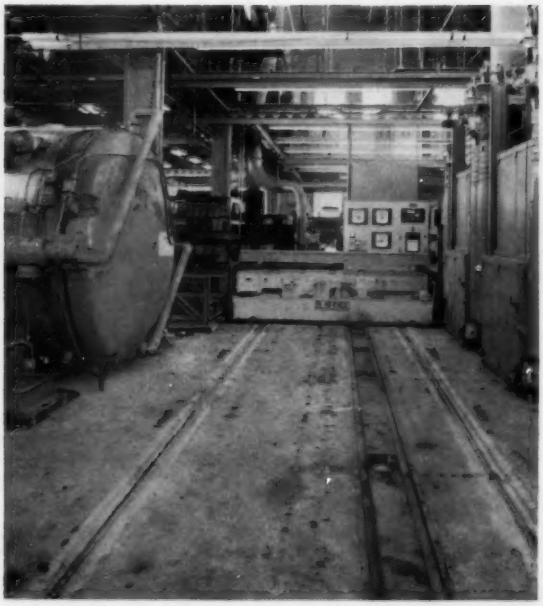


Fig. 5. Remote controlled system seen from discharge end

Fig. 1. To seal it against moisture and foundry dust, primary winding of 400-kva transformer is potted in epoxy compound

Epoxy resin-based compounds have excellent chemical resistance as well as excellent electrical and thermal properties

Epoxies Get Tough Guard Duty

How They Serve in Rugged Insulation Service

By L. J. REJDA, Field Engineer, Larsen-Hogue Electric Co., Los Angeles
L. MORELAND, Development Engineer, Larsen-Hogue Electric Co., Los Angeles

MOISTURE, ACIDS, alkalies, machine dust, carbon black and similar solid contaminants—these have always posed a special problem for the user of electrical equipment. They are a constant source of arcing and shorting in switch gear, transformers, coils, and rotating machinery.

Problems of protection have become increasingly acute throughout the years. For example, it is not uncommon to hear that electrical equipment used by rubber processors, which a few years ago served satisfactorily, will now fail in a few months because of the new grades of carbon black, the chemical attack of new plasticizers, and greater power demands on the machine. Electric motors, magnetic separators, and shakers are particularly troubled by carbon particles because carbon adheres to the insulation, works its way inward, and destroys the coils.

Throughout industry, field coils in a variety of d-c and synchronous motors have often failed in short order when exposed to corrosive chemicals, abrasive dust, and other severe environments. Far too many important and expensive electric machines have had service lives measured in months because materials and techniques were inadequate for rough applications. However, the new epoxy resins, which even the most conservative exponents consider to be exciting materials, appear to offer a permanent solution to these insulation problems. Proper application of these resins offers potential savings of hundreds of thousands of dollars to motor users.

Causes of conventional field coil failures in severe modern environments have been studied by our company for several years. On the basis of this study, we were able to determine the five most important contributing factors:

1. Solid-particle contaminant penetration. Rough areas in the coil surfaces permit fine contaminants to adhere and work their way into the coil. This process is usually assisted by mechanical and electrical vibration.
2. Abrasion of varnish-coated sleeving by dust and mechanical stresses.
3. Deterioration of the varnish because of aging, embrittlement, cracking, and volatilization of plasticizing solvents.
4. Moisture and chemicals attacking various parts of the motors.
5. Localized hot spots caused by uneven heat dissipation arising from air pockets, voids, and solvent bubbles.

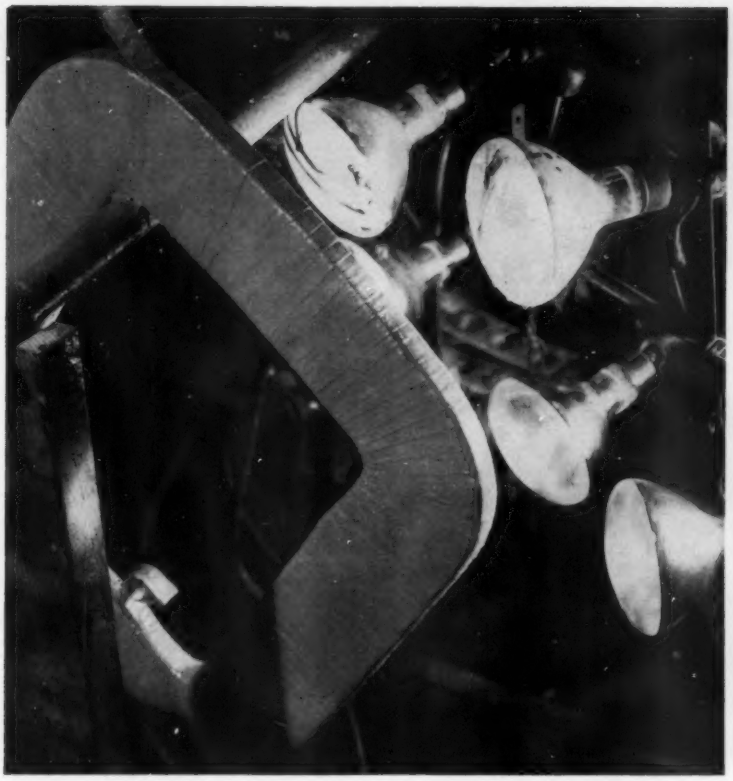


Fig. 2. After the coil is wound and coated it is cured with heat lamps for about 20 minutes. This is big assistance in speeding up time for emergency repairs

Fig. 3. Transformer secondary coils are twice dipped in epoxy varnish, baked each time. Here bonded mica insulation is being taped into place

Fig. 4. For insertion of primary coils secondaries are pried apart with hoist

Even the most advanced fabricating techniques employing conventional materials do not eliminate the above difficulties. The best commercially available varnishes do not always afford adequate protection. Vacuum-impregnation techniques, because of draining and run-off during baking, in our opinion, do not yield a completely filled unit with even heat dissipation. Also, conventional protective sleeving does not withstand the high vibrations and chemical attack encountered in severe applications.

Insulator Should Have:

To overcome these difficulties we were looking for an insulator which could be justified economically and would possess these characteristics:

1. Capable of direct application over each layer of coil windings, thus avoiding the need to attempt forcing the sealer in after winding.
2. Formulation without solvent to eliminate capillaries and entrapped air after curing.
3. High adhesive strength and good shock and corrosion-resistance.
4. Formation of a dense, impenetrable shield to withstand environmental extremes.
5. Electric properties at least equal to those of the conventional materials.

We found the answer to our problem in a liquid insulating compound based on epoxy resins.[1] This compound contains small quantities of special agents — stabilizers, reinforcers, fillers and similar modifiers — which are added to produce the desired dielectric and mechanical properties. The formulations harden into tough solids in a relatively short time after application. They can be applied with a spatula, they can be brushed on, or, for some applications, they can be cast into solid blocks. Highly versatile, these epoxy formulations can be applied in even the most difficult fabricating operations with comparative ease.

Epoxy resins have been finding increasing use as insulation in random-wound and form-coil motors. It was natural, therefore, that eventually epoxy resin based-compounds would be used for all types of electrical coils. For example, special techniques and materials have been developed for field coil insulation. One such material is a brush-on compound, which produces a mechanically strong, almost indestructible coil. In addition, this epoxy compound offers these following advantages:

1. It is easy to handle. No weighing is necessary because the basic formulation is packaged in conveniently sized cans, large enough to permit the catalyst to be added to the original container. The activated compound is then brushed directly on the layers of insulation as easily as paint. Two different catalysts are available, Nos. 1 and 9. Catalyst 1 is a fast-acting type which causes the compound to harden at ambient temperature in approximately one hour. The catalyzed formulation must be used within that time. It is excellent for rush jobs and results in considerable time saving over more conventional materials. Catalyst 9 (long pot-life type) acts much more slowly and permits up to half a day's production to be run from a precatalyzed batch.

Although it necessitates a post-cure, this latter catalyst is recommended for application to each layer of winding because of the freedom it gives to working schedules. By using the brush-on compound, it is possible to eliminate the expensive, time-consuming,

[1] The compounds referred to by the authors are formulated by the Epoxylite Corp., Montebello, Calif., and are based upon Epon resins, the epoxy polymers manufactured by Shell Chemical Corporation.

Fig. 5. When all primary and secondary windings have been assembled, "accordion style" unit is clamped in order to achieve the requisite dimensions

Fig. 6. Assembled coils and second set of laminations placed, leads sealed

and generally less satisfactory post-winding impregnation.

2. One of the unique features of the liquid epoxy-resin compound is that it requires no solvents. Consequently, there is no loss in weight or material and little shrinkage. The cured compound is dense, solid, and capillary-free.

3. Insulation servings in field coils may be poorly bonded to the metal conductor and the surrounding layers of insulation. Voids or air pockets thus formed interfere with the continuous and regular dissipation of heat from the conductor, forming local hot spots which lead to coil failure. Poor bonding, of course, also provides entrances for contaminants and exposes the conductor to the environment.

What Epoxy Resins Can Do

We have found that field coils insulated with liquid epoxy-resin compounds are completely sealed. The compound, brushed on between each layer, saturates the insulation and adheres tightly to the metal and sleeving of the wire as well as the glass tape wrapping. (The adhesion of cured epoxy resins is so great that they are used as high-strength adhesives and have replaced rivets, bolts, and welded joints for certain applications.)

4. Epoxy resin-based compounds have excellent chemical resistance. Immersion in over thirty corrosive chemicals for three months at room temperature showed no detrimental effect. The compounds have withstood boiling lye for 24 hours, showing far greater resistance than that of any conventional varnishes and coatings.

Various random-wound and form-coil motors, insulated according to these processes, have operated under severe conditions for more than three years, and have proven impervious to chemical attack, moisture, and solid-particle contamination. To date, no case of insulation failure caused by environmental extremes has been recorded when the epoxy formulation was properly applied.

For example, field coils for traction equipment have been exposed to temperatures up to 110 F and high humidities in mines and tunnels for almost two years without failure, where three months was the maximum service life attainable prior to epoxy insulation. Similar results have been achieved with large shaker coils constantly exposed to alkalies and moisture.

5. Epoxy resins have excellent electrical and thermal properties. The dielectric strength of one such resin, according to ASTM D149-44, is from 400 to 500 volts per mil. At 77 F, one epoxy resin has a surface resistivity of 9.4 by 10^{13} ohms; and, after 24 hours in water, the surface resistivity is 8.7 by 10^{13} ohms. Arc resistance of the resin, according to ASTM D495-48T, is 120 seconds.

Through the use of fillers, the coefficient of thermal expansion of epoxy compounds can be closely matched to those of most conductors. Also, the high temperature resistance of epoxy resins, until recently unexplored, is proving to be excellent. Specially formulated epoxy compounds have demonstrated their superior heat aging characteristics and high-temperature insulating properties during extended operation at up to 374 F. Service life

at elevated temperatures follows the standard slope on a temperature vs life curve, with properly formulated compounds easily falling in the Class B, 266 F hot spot range.

The coil is wound on a standard wooden form, using a layer of paper to keep it clean. Cotton or glass-insulated wire is used. The epoxy coating is brushed onto the layers of conductors. For this purpose, the long pot-life catalyst No. 9 is usually employed.

After winding, the impregnated coil is removed from the form. A wrapping of glass tape, ¾ in. wide and five to seven mils thick, is then applied to hold the coil in shape. The coil is checked for dimensions, alignment, and form. The epoxy between the layers of conductor is allowed to gel at room temperature for a few hours and subsequently given a post-cure of two hours at 275 F (or over night at 200 F). The coil is then again coated and wrapped with glass tape.

Then, the tape, which is overlapped ¼ in., is pulled tight so that the epoxy compound will saturate the tape and wet its surfaces, yielding a secure and complete bond after curing.

Faster catalyst No. 1 is usually used at this time so that the coating will harden in from thirty to forty minutes. (By the time the last coil is coated, the first has set.) An outside coating with the fast catalyst is applied last of all, resulting in a solidly encased coil.

SPI 7th national Plastics exposition new york coliseum june 11-15, 1956

Leads post a special problem. The leads, themselves, must be flexible, but they must be firmly affixed to the rigid coil. Mounting studs, set into the plastic, are one possibility. However, on many jobs this would require too much time. We have found that covering the leads with flexible, vinyl-plastic sleeving extending back into the insulated coil for six to eight inches is more satisfactory. The leads can then move somewhat at the point of exit without breaking the seal further back in the coil.

For coils not requiring encapsulation, we use an Epon resin-based varnish in which the coil is dipped after winding. This highly adhesive varnish has good tank stability, and is cured at 275 F for eight hours. Over the varnish we apply a coat of the brush-on compound or a thicker epoxy paste to form a protective seal. This type of construction is not as strong mechanically as the type previously described because some varnish solvents and bubbles will remain trapped. However, the external coating is effective against contaminants where vibration and shock are no problem.

With modifications, the above techniques can be used for insulating other types of coils. We have used epoxy compounds and varnishes to insulate and protect d-c coils, shaker coils, dry-type transformers, and magnetic separators in addition to the more widely used synchronous field coils. Any coil sealed and bonded throughout with epoxies presents a solid, corrosion-resistant face to the environment. Cross-sectioned, it will show 100 per cent fill, assuring the ultimate in electrical, mechanical and chemical protection.

Fig. 7. In use underneath the cooling system of an electric furnace, this transformer was badly damaged by occasional flooding. It was repaired using epoxy compound applied over exposed surfaces of transformer and baked with lamps

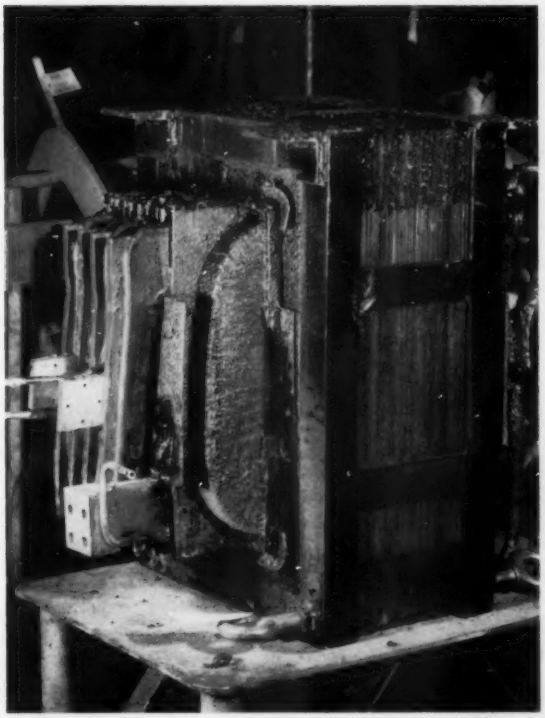


Fig. 8. Rotor from a runaway motor-generator set showing loss of retaining wedge and failure of two coils due to centrifugal force. Unit was rewound, brushing on highly adhesive epoxy compound to add to total strength of unit

City water held in a 500,000 gal tank, distributed through a 16-in. main, into an 8-in. pipe and then through a small drinking fountain bubbler has a good chance of developing bacterial growth due to high ambient temperatures and sluggish flow . . . Here's how Western Electric makes sure no dangerous growths get started in its potable water system

Fig. 2. Plant inspector taking a sample in sterilized bottle

How to Assure Safe Drinking Water:

Chlorination, Routine Sampling, and Local Filtration

By C. C. HELMERS, Factory Engineering, Western Electric Co., Indianapolis

Fig. 1. View at the ceiling of the 16-in. city water supply main showing the chlorine feed connection (indicated by arrow) near the controlling orifice

ALL OF THE DRINKING water of Western Electric's Indianapolis Works is supplied through individual units. In cafeterias the units are dual glass fillers. In all other building locations the units are either single or double installations of electric water coolers of the bubbler type. Some of these units are also equipped with pushbutton type glass fillers. There are 70 locations where drinking water is dispensed at 81 outlets.

The plant city water distribution system is used to supply all drinking water. There is no central cooling system or recirculating loop to supply water to the individual units. City water enters the works in a single line through a flow regulator which maintains plant pressure by working against the water head of a 500,000-gallon elevated water tank. Between the valve and the tank are services to the various buildings. The manufacturing building, and through it the office building, are supplied by a 16 in. main. This 16 in. main supplies a large loop of piping around the manufacturing building, with the smallest pipe of the loop an 8 in. pipe. From this relatively large reservoir, ¾ in. and 1 in. branches supply water to the drinking locations. As the mains are located in the roof trusses, the branch runs generally are between 100 and 300 ft in length.

With the small flow of water from a bubbler, especially in areas of little traffic, the flow in the branches is sluggish and often subject to high ambient

temperatures. This condition, plus normal week-end and holiday requirements, permits the growth of bacteria. Another possible source of contamination is from the elevated tank itself. At times, water flows from the tank when the tank is at full head pressure. Due to the relatively few changes of water, this too, may be another source of bacteria.

To combat any growth of bacteria in our drinking water the following steps have been taken: The initial plant installation includes a chlorinator which is located in the Manufacturing Building. An orifice in the 16 in. main ahead of the building outlets controls a chlorine feed regulated to maintain 0.2 to 0.3 parts per million of chlorine in all of the water used. A visual color type of chlorine comparator is used each day to determine the chlorine residual being maintained and to regulate the chlorinator. As the chlorinator operates on rate of flow, adjustment is required to compensate for varying bacteria content of the incoming water.

At times, a high residual chlorine content received from the water supply requires special regulation to prevent high chlorine residuals. No alarm system is used, as a too high residual affects only the taste of the water; no one will drink water with a residual high enough to be physically harmful. Through this system of semi-automatic and manual control, the drinking water in the mains is usually maintained at 0.3 to 0.5 parts per million of chlorine.

However, an adequate treatment of the water entering the mains does not insure the same residual at all of the bubblers. In heavily populated locations and in the cafeterias, use of the drinking water is generally sufficient to bring the chlorine residual to the outlet.

In more isolated locations the lengthy supply lines, often in high ambient temperatures, tend to permit dissipation of the residual before it reaches the bubbler. This condition was especially noticeable on Monday mornings. On the first Monday of each month, a plant inspector takes a bacteriological sample at five representative locations. These locations are varied each month on an established schedule. These samples are processed in the Works Hospital and the results reported to Plant Inspection. Any sample failing to pass the standard of the American Public Health Association Standard Method of Examining Water and Sewage is retaken. Should the second sample again fail, action is taken.

Failure of any location to pass the test is generally found to be due to a chlorine residual below 0.1 ppm, although it is possible to get a satisfactory water sample on water with nil residual if the line has been previously satisfactory. When the residual is consistently low due to location, a constant bleed is installed on the branch line right at the fountain connection and running to the fountain floor drain.

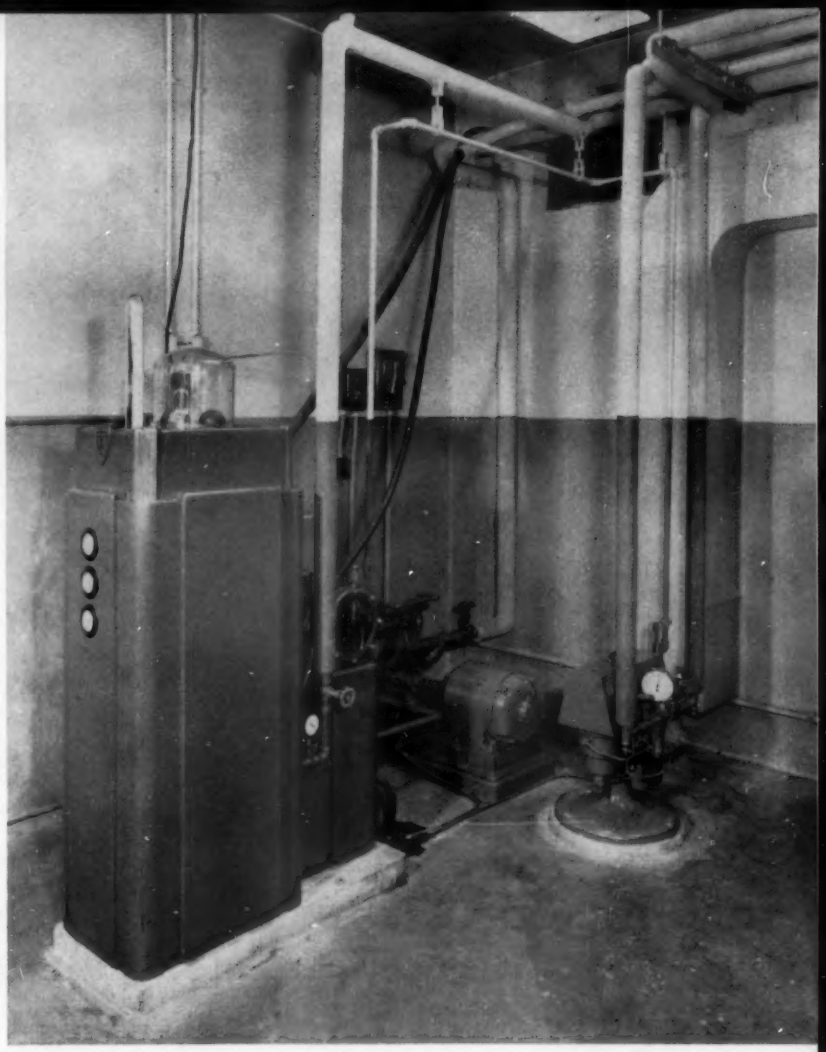


Fig. 3. This is the plant chlorinator located in the lower level machinery room in the Manufacturing Building. It has a capacity of 40 lb of chlorine in 24 hr

The first bleeds installed consisted of a ¼ in. globe valve wheel sealed by Plant Inspection. Bleed seals are inspected once a month. As these seals are difficult to maintain, constant-flow orifices without valves are now being used to control the flow. With these orifices, a flow of ½ gpm is used in critical locations, but in most locations a flow of ¼ gpm appears to be ample. Also there are certain locations where the standard electric air-cooled units are not able to supply the demand in the summer time.

Recently a water-cooled unit was installed and was found to be completely satisfactory. At full load this unit uses 30 gph for cooling; it is expected that no bleed will be required at any time. Similar units are proposed for molding areas and high use areas where standard units are not satisfactory.

Special cases are the drinking water fountains in the Boiler House and Service Garage. These buildings have separate services also taken off between the supply regulator and the tank. The Manufacturing Building chlorinator took care of the Office Building, fed from the main Manufacturing loop, but did not care for the isolated buildings. This problem was met by running a 1 in. branch line from the Manufacturing Building through the existing piping tunnels to supply the Boiler House and Garage fountains only. Each fountain was then equipped with a ½ gpm constant-orifice bleed. This installation has been satisfactory.

No location has again failed to pass the test since the policy was adopted

(Continued on page 232)

Fig. 1. Receding flood waters caused this small falls effect from second story level of a Torrington Div. building

American Brass Flood Recovery

Electrical Firms Lend a Hand in Big Rehabilitation Job

RAINFALL DELUGED the Naugatuck River Valley in Connecticut in unprecedented volume in August of 1955. The saturated condition of the ground contributed to the water runoff into the normally mild Naugatuck River. The rapid rise of the river was augmented by a spillage of a large water storage reservoir. Eventually the stream became a raging torrent of destruction hitting a rate of flow of approximately 50 mph. The private dam north of the Torrington Division plant of the American Brass Company gave way under impact. Water filled the plant rapidly and reached a height of about nine feet in the plant at crest time. About 18 miles downstream plant buildings in the Waterbury Division were as much as 17 ft under water. The Ansonia Division plant which is approximately 20 miles below Waterbury was also inundated.

As the waters subsided the company was faced with a herculean job of rehabilitation on three fronts. Each division was faced with the need for rapid mobilization of men and equipment for cleanup operations of unprecedented magnitude in the company's experience. Tons of mud, silt, and debris were dragged into plant buildings, Fig. 5. In some areas, deposits reached a height of over four feet above the floor level.

There was no immediate or made-to-order organizational set-up to be put in effect to cope with the disastrous consequences. At first, it amounted to putting out the best effort under the circumstances. With a little time, orderly planning and procedures began to take shape.

The crest of the flood hit Torrington on Friday morning. On Saturday, the mechanical supervisor and the power supervisor sat at their home telephones and made calls to owners and operators of earth moving equipment, including such things as front end loaders, bull dozers and trucks.

On Sunday, the first management meeting was held at the plant. At this time, a general evaluation of the job at hand was made, marking the beginning of organized procedures. The lack of telephone communication posed an immediate problem. As an emergency solution, plant supervisory people were designated as "runners" who helped transmit information on developments and work progress until telephone contact was established. The other two divisions also had similar meetings.

Many workers were required for the heavy back breaking efforts of cleaning. Supervisory personnel telephoned the regular plant employees for their help. This need for manpower was also relayed by radio and word-of-mouth. In a relatively short time 300 people showed up as a result of these efforts. By Sunday earth moving equipment started arriving at the plant.

To permit workers to travel between their homes and the Torrington plant as well as the ones in the other divisions, clearance passes had to be issued them. The communities that were in the path of the flood waters were placed under martial law and movement by individuals was closely restricted.

Precautionary measures were taken to protect the health of the employees. In all three divisions employees were given a series of typhoid shots. These were administered in temporary plant "hospital" areas inasmuch as medical facilities were destroyed by the flood.

As an added precaution any person who received a cut or scratch was required to report for tetanus shots.

Drinking water supplies in the three plants were crippled and contaminated. Some provisions had to be made to get fresh water to the workers. In the case of the Torrington plant, a new milk truck was leased from a neighboring firm. Water in the truck tank was treated chemically under supervision. The other two divisions had water trucked to them in suitable containers from nearby artesian wells. These supplies were also treated and iced daily. In the Ansonia Division, the sprinkler water lines were cross connected with the mill service lines for the use of water for sanitary purposes only.

Use of Earth Moving Equipment

In Waterbury, the earth moving equipment needed for clean-up was mobilized mainly through the efforts of the Purchasing Department working in liaison with the works manager. The job of hauling the accumulated flood deposits from the plant and surrounding areas was given to a firm which is normally employed to remove debris to the city dump. To this organization was also given the responsibility of hiring additional trucks and of supervising hauling operations in general. Incidentally, all trucks engaged in the Waterbury plant rehabilitation operations displayed suitable emergency stickers for their clearance.

In the Ansonia Division, roundup of heavy cleaning equipment was first conducted under the supervision of the mechanical supervisor. Renting and unit placing was done by people in his department. After telephone communications were restored, assistance was given them by the Central Engineering Department in Waterbury. A construction firm, although not a regular contractor working for American Brass, agreed to furnish earth moving equipment. Two-way radio was put to use to direct the various operators to move their units to the Ansonia plant of American Brass. A short time later there were fifteen pieces of equipment ready for work. Within a day, there were enough units to permit the assignment of smaller equipment to the various departments.

At the outset of cleaning activities by the men at the three plant locations, there were pressing demands for worker equipment. An idea of the requirements of this nature can be gotten from the fact that at the Waterbury Division alone there were approximately 300 shovels, 250 wheelbarrows and 150 pairs of rubber boots in use. In some instances, employees brought their own equipment after being informed of the shortage in supplies locally. Controlling so many small items becomes a problem in itself. Experience indicated the importance of emergency record keeping, no matter how crude.

In Torrington, the general clean-up work force was divided into four main groups. Each of these was under the immediate direction of a production supervisor. The overall job was also divided into specific cleaning areas. A number of small front end loaders was assigned to each of these. Each group of small loaders had its own central dumping area. The matter that they accumulated was handled by one large front end loader assigned to the group. This unit kept three road trucks busy during the early stages of cleaning activities. The number of trucks was reduced as the work load was diminished.

In Waterbury, instructions for the removal of mud, silt and debris originated with the division foremen. Cleaning operations within departments were directed by the departmental foremen. This supervision involved not only the mechanical equipment but also the men on the shovels. The division foremen were given, in addition, the responsibility of keeping track of the amount of hauling that was done by the hired road trucks. This was no small job in view of the fact that there were 50 trucks at the plant only a few days after the flood waters subsided.

As in other company plants, cleaning operations in Waterbury went on during the daylight hours inasmuch as the electrical systems were crippled. The men worked on two six-hour shifts. In the first ten days of cleaning activities around 5,000 man-hours were expended.

Daily Meetings

In the early stages of rehabilitation work, meetings of executives and supervisory personnel in each of the three divisions were held daily. Later as the pace slackened and the efforts were relatively well organized, the divisional conferences were held weekly, Fig. 2. In addition to these meetings, there was a weekly conference in the main office building in Waterbury. This involved top level people from each division with Mr. William M. Moffatt, the executive vice president in charge. These sessions provided good opportunities for interchange of ideas and experiences between divisions in addition to discussions on progress.

One helpful managerial guide that was used effectively in getting equipment and departments back into service was a priority list, Fig. 3. All three divisions expedited work and

Fig. 2. Weekly conferences including executives from three divisions were conducted by exec. v. pres. Wm. M. Moffatt

kept track of progress using priority guidance. In Torrington, for example, it was decided to put the rod mill in operation, first. It was the least affected by the flood and the job of getting the mill back into production was considered to be relatively easy. Another mill was given an early rehabilitation completion date because it had generally the oldest equipment offering reduced complexity for dismantling and assembly. Each piece of production was assigned a target date of expected completion.

The first major phase of rehabilitation operations dealt with the plants themselves. The second one pertains to the reconditioning and replacement of electrical and mechanical equipment. In the early stages of rehabilitation operations, arrangements for assistance on electrical work were made by the Central Engineering Department in Waterbury. Negotiations concerned three major manufacturing companies of industrial electrical equipment. Central Engineering also got in touch with organizations experienced in heavy rigging work to help in handling and dismantling of electrical and mechanical equipment. This call for millwrights and riggers extended to American Brass plants in other states. Skilled millwrights, mechanics, and electricians were loaned by western divisions of the company.

Cleaning of mechanical equipment in the Torrington Division was done under the direction of the mechanical supervisor. He, incidentally, is normally responsible for the plant engineering functions in the plant. This work was executed by 26 small groups which were composed of production people each working under the guidance of a machinist from the mechanical department. The plant engineer as well as the maintenance engineer were instrumental in organizing these units, which involved approximately 200 men. A similar arrangement was used in the Waterbury Division. Use of production and operating people for equipment dismantling gave the men a greater appreciation and respect of the units that they operated in normal times.

Steam Jennys Helped, Too

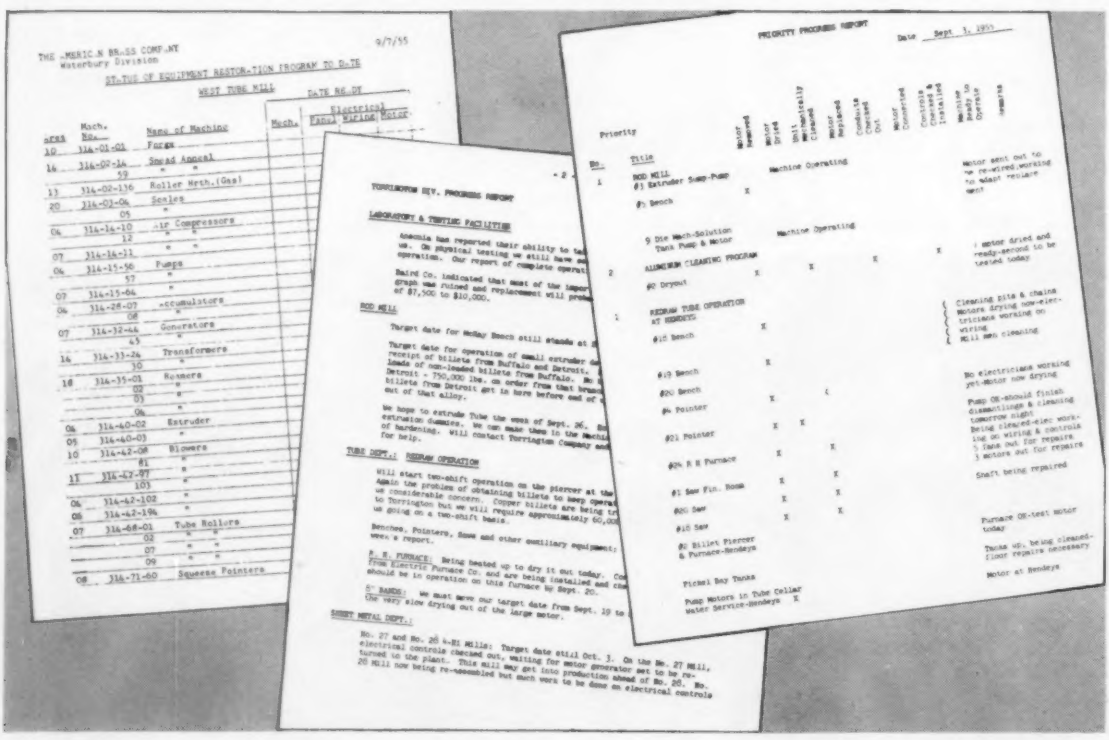
The men needed steam for some of their cleaning work but none was available through the normal steam supply systems which were incapacitated. This was solved through the purchase of portable steam jennys. In the case of the Waterbury Division at least, it was planned to retain some of these units after the emergency and use them as conditions demanded.

Electrical rehabilitation work including control and switchgear reconditioning and rewiring was an enormous task in each division. On an overall scale it was staggering. Electrical contractors were hired mainly through the efforts of the Central Purchasing Department in Waterbury. Inasmuch as many firms were affected by the flood, skilled help was naturally in short supply. The contractors augmented their forces through the help of the labor union. Through this channel locals in other parts of the country were alerted for help. Some of the demand for skilled labor was satisfied by transient workers who arrived on their own in the stricken areas.

The task of reconditioning hundreds of motors in the Torrington plant was performed under the direction of technical people from the Allis-Chalmers Mfg. Co. This firm sent eight men to make a survey of the damage and to arrive at a plan of procedure. Some of the men in this group were experienced in work concerned with rehabilitating flooded motors having been exposed to it after the Kansas City flood in 1951.

At first, it was decided to send the motors out of the plant for drying. Then an idea was projected to make use of the available floor space in the plant. Roller conveyor sections were set up to take care of cleaning and drying operations on a production basis, Fig. 4. Portable oven enclosures, eight in number, were made by the

Fig. 3. Paperwork helped keep track of status of equipment, progress of operations and designated order of putting units back into service. Anticipated and actual unit starting dates were later added to the type of form shown on left



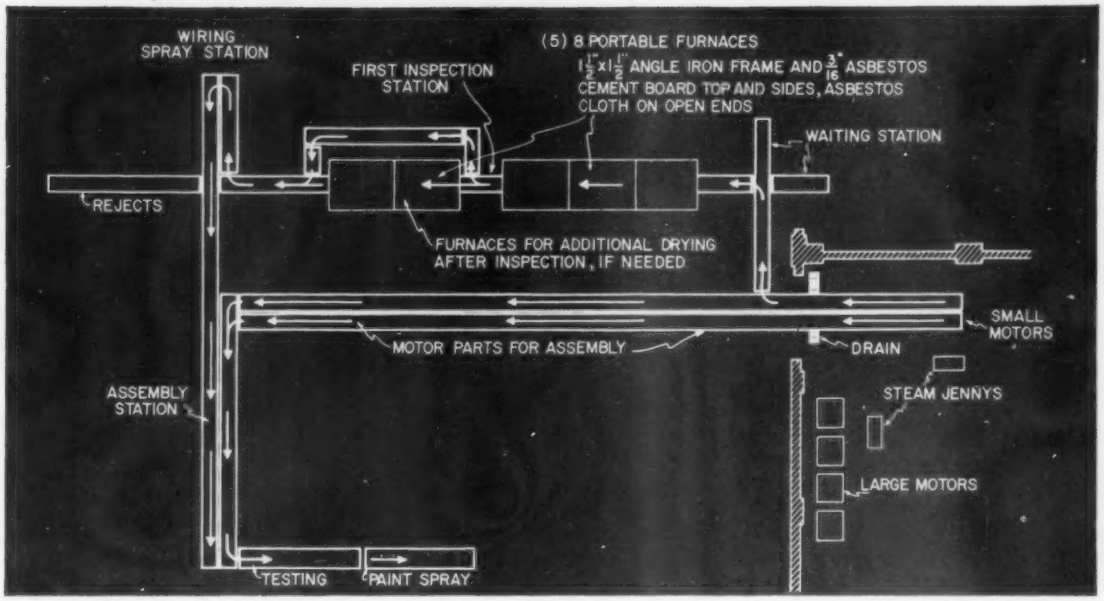


Fig. 4. Schematic diagram gives an idea of setup for cleaning and drying of electric motors at the Torrington plant

plant maintenance personnel. These were four feet square in cross section and eight feet in length. They could be readily pushed together or used individually as the conditions demanded. The sides were made of asbestos board on an angle iron framework and the ends were covered with asbestos cloth. The sources of heat in these ovens, were banks of infra red lights and strip heaters. In the case of large and heavy motors which could not be handled on the conveyor line, portable, individually-fired hot air blowers were used.

Before delivery to the drying ovens flooded motors were tagged with information to assure their proper relocation. Cleaning operations on motors began outside inasmuch as the conveyor system extended out of the building into an area where steam jenny cleaning was done. The disassembled motor parts followed one branch of the system while the stators were conducted through ovens on a parallel line.

"The method consisted of first flushing the motors with clear water from a hose to remove loose dirt and debris. The motors were then dismantled and again flushed with water to remove any dirt and loose particles that were confined within the motor.

"The entire surface of the stator windings was then thoroughly coated with an emulsion cleaner which contained a rust inhibitor. Next, the surface and interior of the yoke was cleaned with a steam jenny which contained a mild detergent solution. After this was completed, the stators were flushed with a solvent to remove the last traces of oily films, fine grit, and other foreign materials.

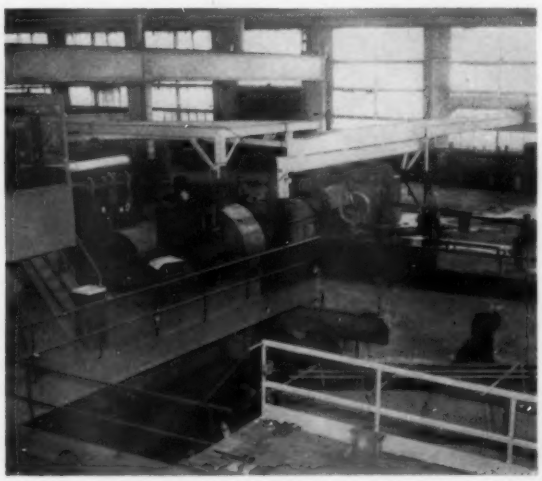
"All bare steel surfaces such as shaft journals were coated with a rust preventive oil for protection against rust during the drying operations and until the equipment was reassembled.

"Megger readings after the baking were well above the NEMA standards of 1,000 ohms per volt, being infinity in most cases. The windings while still hot were spray-coated with at least two coats of air dry varnish.

"The motors were then assembled and tested. The following items were

Fig. 5. "Breakdown" mill in Ansonia plant after the flood

Fig. 6. Picture of mill from another angle taken after cleanup



noted and checked: cold Megger readings, bearing condition (in most cases, all bearings were replaced) oil ring operation and hot coils. A special oil was used containing a mixture of rust inhibitor and No. 30 lubricating oil when the sleeve bearing motors were run on the idle test. Addition of the inhibitor reduced the viscosity to a 15-20 range.

"The 440 v motors were run idle for 10 min at normal voltage with a secure ground wire. The 2300 v motors were run on 440 v since 2300 v would have been too dangerous. Motors that were above 400 amp at 440 v were not tested because of testing capacity limitations. Direct current motors were turned over with 120 v shop power for field excitation. A welding machine supplied the armature voltage. Bearings were checked and commutators polished.

"After completion of test, each motor was spray-painted with a high grade enamel of American Brass color choosing and was placed in a storage area to be drawn at the company's convenience. This reconditioning project of flood damaged electrical rotating equipment involved the processing of 706 motors amounting to 15,000 hp."[1]

Motor rehabilitation was only one phase of activities in which manufacturers' technicians were of help. A number of firms sent technical people to direct work on control systems. A good example of the joint effort of skilled people was the work carried out on the intricate electrical and electronic arrangements in the basement below the rolling mill stands.

Of interest may be a small problem

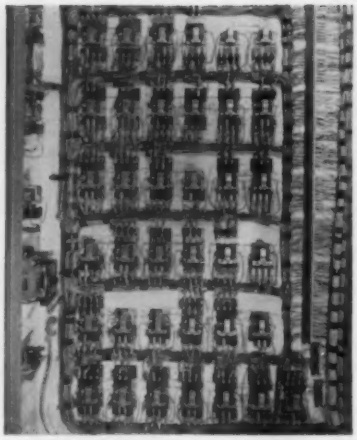


Fig. 7. Typical open relay setup. Units had to be removed, cleaned thoroughly, dried out. They then were reassembled

that one of the supervisors from an electrical firm had to cope with. A length of new 750,000 CM cable had to be pulled through a conduit. For clearance, it seems, a dip extending over a foot was put in the conduit. Water was trapped at this point and, of course, had to be removed. First, air was blown through the conduit but this was of no avail.

Then four strip heaters were connected in series to the outside of the conduit in proximity of the trap and 230 v current was forced through, heating the surrounding area to about 70 C. While this was going on, compressed air was blown inside the conduit at a slow rate. This did the trick resulting in a satisfactory insulation resistance Megger reading.

In the Waterbury Division, motor rehabilitation was handled in a somewhat different manner. The units were tagged and loaded on trucks for transport to General Electric's facilities. As a matter of fact, switchgear was also reconditioned outside the plant.

"All intricate control and wiring on Breakdown and Finishing Mills had to be dismantled, cleaned and dried out and then reassembled and tested. All of the drying out was done by building a temporary housing around the equipment, and using portable furnaces with blowers to move the moisture-laden air out of the compartment; each furnace was capable of liberating 400,000 Btu per hour.

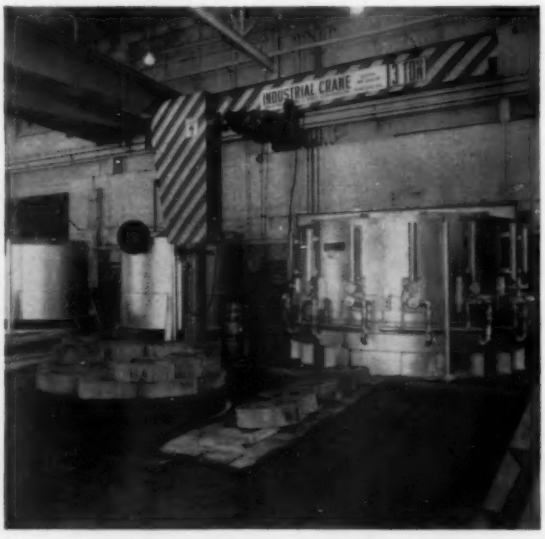
"All large motors were dismantled and cleaned. Windings were steam-jenny washed then covered with a temporary structure and one-fifth voltage was applied to windings to give rated full load current. This provided heat in addition to that of the furnace. Within a reasonably fast time the outside temperature of the windings would be brought up to 110 C, and heat would be kept on until satisfactory Megger readings were obtained.

"Approximately 1300 motors, from fractional to 600 hp ratings were taken out of the three plants in the Waterbury Division. In order for us to take care of this great volume it was necessary for us to call on our New York, Philadelphia, Boston, and Southington shops as well as set up two temporary ones. We used the facilities of our Bridgeport Cable Works. A sub-station was rented from the power company and was converted into a repair shop, with drying equipment, cleaning, painting and assembly test sections. To staff these operations we drew men from all over the country, and hired a supplemental force locally

[1] A. C. Beiser, Service Engineer, Allis-Chalmers Mfg. Co.

Fig. 8. Raging waters upset bell-type annealing furnaces

Fig. 9. Weeks of labor is reflected in good furnace appearance



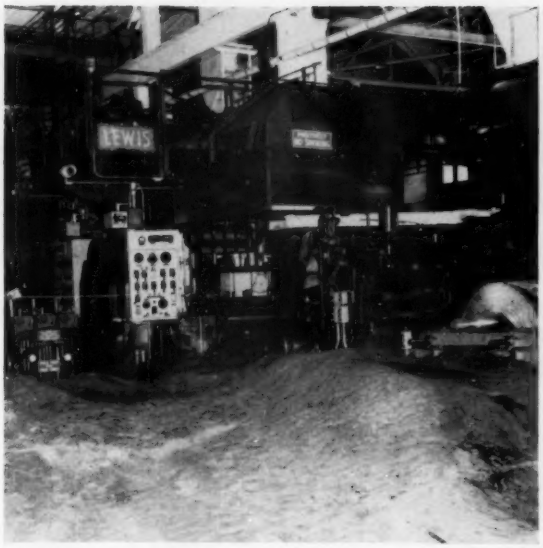


Fig. 10. Aluminum rolling equipment was locked in mud, silt

Fig. 11. Reconditioning of mills involved electronic controls

—working a crew of about 400 people—24 hr per day.

"We started the assembly of our organization one day after the flood on August 19 and the three Waterbury plants were completely back in operation on November 25. There was an interim flood scare making it necessary to disconnect rehabilitated equipment and raise it to a higher level to escape the second threat of water."[2]

There was an observation in the cleaning of motors that may be of interest. About ten minutes after a motor was placed in a degreaser, it was pulled out and appeared quite dry. Consequently, Megger readings revealed that the insulation resistance went up from zero to infinity in that span of time.

The electrical rehabilitation work at the Ansonia mill was handled under the responsibility of the plant engineer and the power engineer. Crews of six men removed and tagged motors which were shipped to shops that could handle the cleaning and drying and reconditioning work. Of course, a great deal of the in-plant work was done by men employed by electrical contractors. Comments on the participation of the Westinghouse Electric Corporation in the overall electrical operations are mentioned below:

"In order to handle the work, we used all available engineering help and service engineers from the Connecticut Valley and surrounding areas. We flew in other Westinghouse engineers from all parts of the country; we hired local contractors, electricians, riggers, millwrights, truckers, and stationary engineers. All trade union personnel involved were obtained locally.

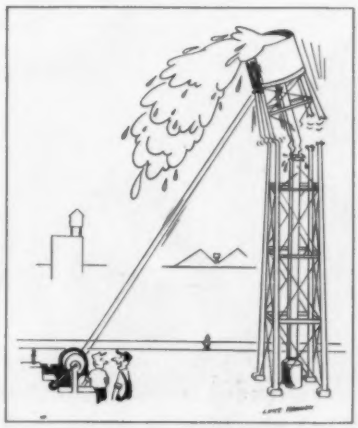
"All equipment which was too large to be moved was serviced by the above group at the plant location. Drying ovens were built right on the spot and were made of asbestos tarpaulin. We purchased heater blowers and gasoline-driven generators for testing and drying of equipment. All control, switchgear and cable conduits and wires were dried on the spot. Equipment handled in the field ran as high as: motors up to 2,000 hp; generators, 1200 kw, d-c; circuit breakers, 15 kv. A local garage was rented for instrument repair.

"All motors, generators and associated equipment at American Brass that could be moved were directed to our Bridgeport, Conn., Hillside, N. J., Springfield, Mass., and Boston, Mass., repair shops, depending upon which shop was in the best position, at the time of shipment, to handle the load. Many of the units were shipped to Hillside to be dried under vacuum.

"All those shops were completely equipped to handle the damaged equipment and were working 24 hr a day to get everything back into operation as fast as possible."[3]

Of great importance to the plant cleaning operations and the overall rehabilitation activities was the availability of overhead crane service. It was expedient to put this equipment to work as soon as possible. In Torrington, the rod mill is located on high ground and, fortunately, damage by flood waters was slight. The 250 v, d-c generator, ordinarily supplying power to the mechanical draw bench in this mill, was hooked up to the crane power supply lines. In one plant of the Waterbury Division cranes were in operation inside of ten days. In another plant, crane service was restored in two weeks with a 190 kw portable diesel generator supplying power. For emergency crane power in the Ansonia plant, pairs of electric welding machines were connected together. In one case, this type of power supply was adequate for the operation of six cranes of ten ton capacity each. Additional power at the Ansonia plant was supplied by portable generators for about six or seven weeks after the flood.

The flood in the Naugatuck Valley was a terrible and costly experience. It was, nevertheless, a grim teacher in the value of organization and group action. It showed the importance of the cooperation given by various manufacturers under difficult conditions.



"Forget something?"

[2]J. J. Durkin, Manager-Northern Region, General Electric Co.

[3]A. H. Monitto, Westinghouse Electric Corporation.

Fig. 1. Locker space for plant workers is provided on this mezzanine. Below it are located the washroom facilities

Ditto's New Plant Is No Carbon Copy

EXPANDABILITY and flexibility were prime requirements set by Ditto, Incorporated, when it decided to consolidate multi-plant operation in Chicago into a modern one-unit building in suburban Lincolnwood. Result: a 312,000 sq ft building that is equipped to grow three ways—inward, outward, and upward.

To accomplish this feat, the planners kept fixed interior walls to a minimum, provided for mezzanines to be erected wherever needed, installed demountable exterior sandwich walls and arranged for another story on a single floor office section.

Planned for 33% Increase

In its present state, the plant is planned to handle a 33 per cent increase in manufacturing operations without any need to alter the plant's basic structure or service facilities in any way.

Part of this flexibility is implemented by the elimination of all but the most necessary structural walls within the manufacturing area. To

Fig. 2. Mezzanines are also used in the new plant to provide space for electrical equipment and offices. Shown here is a substation and below it an office area

Fig. 3. Corridors are designed to be quiet, light and easily cleaned. Flooring of asphalt tile; walls are of glazed tile

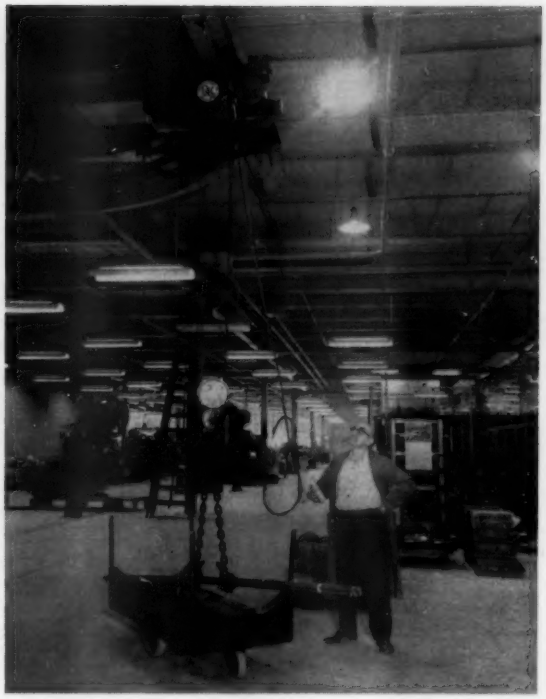


Fig. 4. Hoist on a U-shaped monorail is used to move steel stock from truck berths (not visible at left) to storage area

understand how this was brought about, a brief description of the plant's organization is in order:

Two completely independent production operations, apart from the administration offices, are housed in the plant. Duplicating machine manufacturing operation is located at the east end of the building. Duplicating supplies (fluid, carbon, etc.) are produced at the west end.

Separating these two areas is a storage and warehouse section, approximately in the middle of the building. Separation here is by removable wire mesh partitions only.

These 24,000 sq ft of storage space form a maneuverable buffer zone between the two manufacturing areas. There is only one fixed obstacle in this storage area—a masonry fire wall that divides the plant into two sections.

Thus, if necessary, part of the storage space can be converted to an auxiliary manufacturing section for either product—machines or supplies.

No fixed walls exist within the machine and supply manufacturing areas. To separate the various operations, wire mesh partitions are used.

No special footings are required for any of the machines. Equipment can be moved about almost at will to provide any production pattern wanted.

Permanent service facilities, such as production and engineering offices, laboratories, first aid room, cafeteria, model shop, fluid storage room, boiler room, paint shop, and truck docks are located along the north and south walls of the manufacturing areas.

This keeps east and west walls free for future expansion, and keeps the main manufacturing floor free for maximum flexibility.

Absence of fixed walls within the manufacturing areas also permits construction of mezzanines wherever needed. The plant was built with a 16-ft ceiling clearance to provide for double deck operations.

Seven island-type mezzanines to-

(Continued on page 198)

Fig. 5. No permanent walls are used to separate the various manufacturing and storage sections; instead wire partitions are employed for maximum flexibility

Figs. 1, 2. Jib crane and hoist, left, and controls in the overhead crane, above, are serviced as prescribed in the Plant Maintenance Schedule

Maintenance—According to Schedule

Hyster Outlines Specific Procedures for Servicing Plant Equipment

By **COLLIN A. HERRALA**, Maintenance Supervisor, Hyster Co.

CONSIDERABLE SAVINGS in man-hours and equipment downtime has resulted from a carefully integrated maintenance and checking system. The plan has been in operation for two years and has proven so successful that our other Hyster plants are adopting it.

These results have been obtained by placing the main emphasis on preventive maintenance. Preventive maintenance is covered by a very complete Plant Maintenance Schedule* worked out to include practically every detail on major equipment in the plant. Such information as periods of maintenance—be it daily, weekly, monthly or yearly—is included for each piece of equipment along with a description of the maintenance steps to perform.

Following is a list of the equipment covered in our Plant Maintenance Schedule: heating systems, lighting, electric motors, motor-generator sets for welding, transformers, compressed air systems, steam cleaners, paint booths, production machines, fire protection and cranes and hoists.

Inspections and tests for the above-mentioned equipment are described in detail in the Schedule. Take, for example, the heating systems. There are two boilers in the assembly building, two in the main office basement and one in the warehouse. All boilers and burners receive a daily inspection covering six specific points. They also receive a weekly check, covering ten specific points.

Schedule for Boilers

Inspections and tests will cover cleaning the boiler tubes and burners, checking the automatic feedwater operation, checking condensate return pumps and motors, etc. Finally, there is a yearly examination of the boilers to prepare them for the state inspection. This covers seven specific points.

In addition, the office heating units are on a daily, monthly and yearly maintenance schedule. Monthly and yearly maintenance is also scheduled for four heating units in the assembly building, 19 vertical and three horizontal type unit heaters in the same building, 11 in the machine shop, four in the tool room and 26 in the warehouse.

Steam and condensate return piping receive yearly maintenance, air conditioning equipment is checked every six months and ventilating fans receive monthly and yearly care. In every case, the different items to be checked are clearly specified. For instance, the monthly maintenance of the ventilating fans covers lubrication of the fan and motor bearings and the yearly maintenance covers cleaning of the fans and motors and checking the electrical controls.

Whenever these inspections show the need of repair work a Maintenance Request and Report form is made out and turned in to the maintenance

* See boxed item on third page of article.

supervisor who then assigns a man to do the job.

The preventive maintenance program is carried out with the help of a Remington Rand Kardex file containing an Inspection Record card for every machine in the plant. This Kardex file is checked periodically by the maintenance supervisor. Whenever a machine is due for inspection a Check Sheet is issued for it and given to one of the maintenance men who then makes his inspection, does whatever maintenance is necessary and fills out the Check Sheet.

This sheet is then returned to the maintenance supervisor who enters the date of the inspection on the Inspection Record card. Any major repair work is entered on the back of the card so that a complete history of the performance of the machine, or item of equipment, is available at all times. All Inspection Record cards remain in the file permanently. The Check Sheets are filed separately for future reference.

Once a year an Improvement Requisition is drawn up to cover a one year period. This is really a budget giving the estimated cost, with a surplus for contingencies, agreed upon jointly by the plant manager and maintenance supervisor. The requisition is then sent to the general manager for authorization.

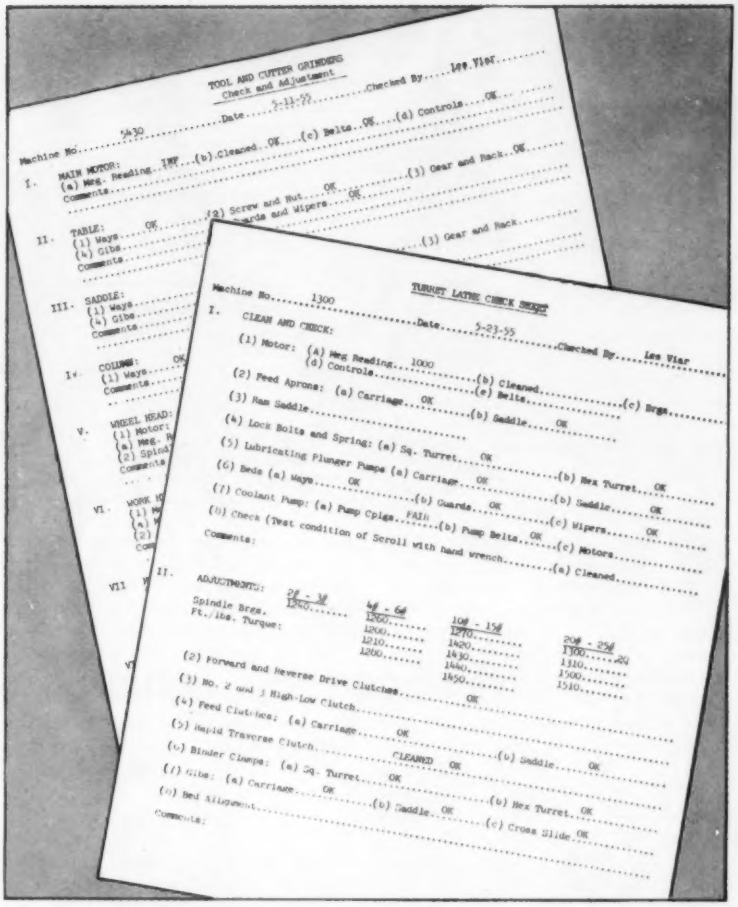
Emergency Calls

Emergency maintenance calls are handled by telephone from the breakdown point. A call bell is used to summon the maintenance supervisor if he is not in his office. A specialist from the maintenance department is then dispatched to the scene of the trouble. Safety hazards and key machine breakdowns have priority.

Each day every member of the maintenance department fills out a work schedule or time card. Assignments from the supervisor are entered on the card with estimates of the time that will be required to handle the job. Upon completion of the work indicated on the card, the maintenance man fills in the actual time required to do the job. This permits systematic work-planning and eliminates the necessity of conferring with the supervisor except in cases of emergency.

The maintenance department consists of the maintenance supervisor, two electricians, one electrician's helper, two journeymen machinists and three millwrights, one of whom spends his full time on lubrication. These may receive incidental help from the operator of a machine on which they are working, or others.

The maintenance supervisor meets every Wednesday at 10 A.M. with the


TOOL AND CUTTER GRINDERS
Check and Adjustment

Machine No. 5430 Date 5-13-55 Checked By Lee Vier

I. MAIN MOTOR: (a) Meg. Reading 1MF (b) Cleaned OK (c) Belts OK (d) Controls OK
Comments

II. TABLE: (1) Ways OK (2) Screw and Nut OK (3) Gear and Rack OK
(4) Gibs (5) Guards and Wipers
Comments

III. SADDLE: (1) Ways (2) Gibs (3) Gear and Rack
Comments

IV. COLUMN: (1) Ways OK
Comments

V. WHEEL HEAD: (1) Motors (a) Meg. (2) Spind
Comments

VI. WORK H (1) M (a) (2) Com

VII

TURRET LATHE CHECK SHEET

Machine No. 1300 Date 5-23-55 Checked By Lee Vier

I. CLEAN AND CHECK:
(1) Motor: (a) Meg Reading 1000 (d) Controls (b) Cleaned (c) Brgs
(2) Feed Aprons: (a) Carriage OK (b) Saddle OK (c) Belts
(3) Ram Saddle
(4) Lock Bolts and Spring: (a) Sq. Turret OK
(5) Lubricating Plunger Pumps (a) Carriage OK (b) Hex Turret OK
(6) Beds (a) Ways OK (b) Guards OK (c) Saddle OK
(7) Coolant Pump: (a) Pump Cplgs. FAIR (b) Pump Belts OK (c) Wipers OK
(8) Check (Test condition of Scroll with hand wrench (a) Cleaned (b) Motors
Comments:

II. ADJUSTMENTS:

Spindle Brgs. Ft./lbs. Torque:	2# - 3#	4# - 6#	10# - 15#	20# - 25#
	1240	1500	1370	1300 - 20
		1260	1420	1310
		1210	1430	1500
		1200	1440	1510
			1450	

(2) Forward and Reverse Drive Clutches OK
(3) No. 2 and 3 High-Low Clutch
(4) Feed Clutches: (a) Carriage OK (b) Saddle OK
(5) Rapid Traverse Clutch CLEARED OK
(6) Binder Clamps: (a) Sq. Turret OK (b) Hex Turret OK
(7) Gibs: (a) Carriage OK (b) Saddle OK (c) Cross Slide OK
(8) Bed Alignment
Comments:

Fig. 3. Shown are several examples of the various forms which help the Hyster Company keep a constant check on the performance of their plant equipment

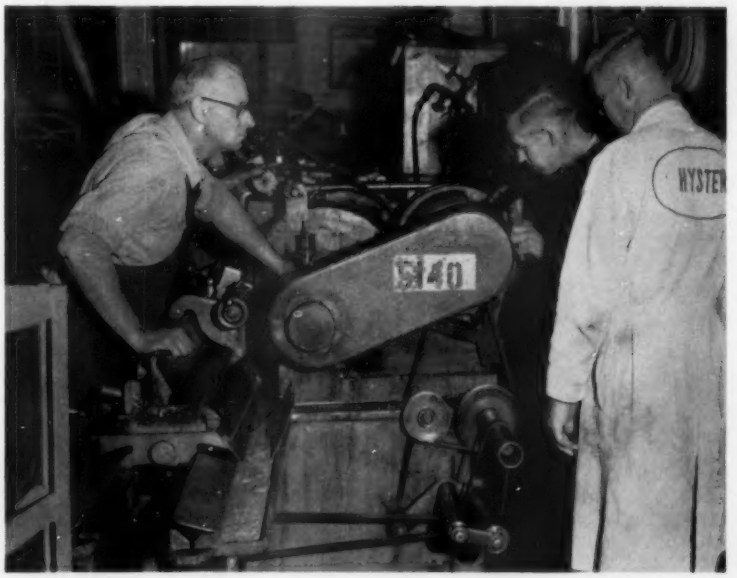


Fig. 4. The author, in white smock, and maintenance department workers carefully check an external grinder to determine the extent of repairs necessary

plant manager and plant engineer. At these meetings maintenance problems are discussed with a view to bettering the service and taking care of new conditions as they arise.

Maintenance of our electrical equipment has been analyzed and instructions for the proper care of this equipment is outlined in detail. Several examples are reproduced here as given in the Plant Maintenance Schedule.

Electric Motors—It is difficult to set a definite rule to apply equally to every motor for experience will indicate that some motors will need more attention than others because of their construction or the conditions under which they operate, such conditions as dirt, moisture, etc. However, the following will apply to nearly every motor.

Sleeve Bearing and Wick Oiled Motors—Lubricate once a month—only a few drops of oil in oil cups and level in wick reservoirs are necessary.

Clean once a year. a. Remove from mounting and take to maintenance bench; b. Take Megger readings; c. Dismantle motor and pull bearings; d. Blow dirt from windings and wash with carbon tetrachloride, (Do not inhale fumes—have area well ventilated); e. When windings are dry, apply a coat of varnish; f. Wash and varnish bells; g. Wash out bearings in cleaning solvent and pack with grease; h. Assemble motor and replace on mounting.

Ball Bearing Motors—Remove grease fitting from motors and replace with pipe plug, this will eliminate the possibility of overgreasing the bearings. Clean motors once a year, following steps a to h above.

Wound Rotor Motors (crane motors)—Examine collector rings and brushes every three months. Look for accumulation of carbon dust from brushes and metal from rings. Check brushes and rings for wear. Test insulation every three months. Carbon dust and metal may have reduced resistance as well as the air gap. Examine resistors and drum controllers every three months. Check connections for tightness.

Maintenance Schedule

Readers interested in obtaining a mimeographed copy of the maintenance instructions described in this article, kindly indicate "PM Schedule" on the postage-paid card in this issue or write to The Editor, Plant Engineering, 110 S. Dearborn St., Chicago 3, Illinois.

As proper care of cranes and hoists are also of particular importance, the instructions for them in the Preventive Maintenance Schedule cover the following steps:

Jib Cranes and Hoists—Operate hoist to see that it functions smoothly. Check proper operation of limit switches. Check load cable for signs of wear and abuse. On cables, check for fraying and kinking. Wipe with oily rag. On load chains, measure wear with gage. Check each link for flexibility.

Inspect load hook and fastening and measure throat of hook. Check operation of brakes under load equal to rating of hoist. Inspect pendant or pull cords for wear or abuse. Lubricate according to manufacturer's specifications. Clean and inspect hoist housing. Check for cracks in casting. Inspect hoist suspension hook and trolley. Make sure suspension hooks are tight and properly safetied. Check trolley for wear. Lubricate where necessary.

Check jib. Jib should rotate freely and should remain stationary. Lubricate pin.

Make minor repairs. Replace worn pull cords, tighten nuts and bolts, etc. Report repairs which should be made.

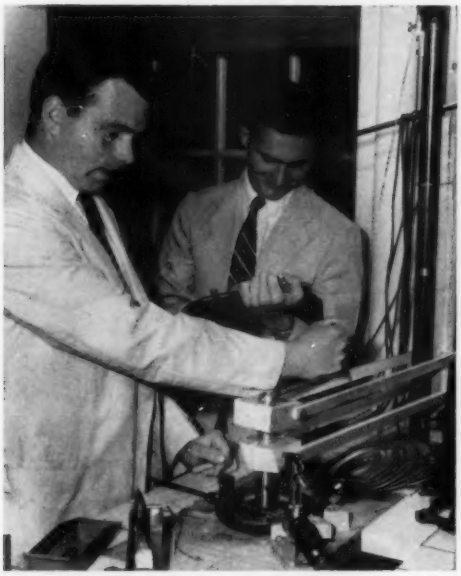
Compressed Air Systems—Proper care of compressed air systems is outlined in the schedule on a daily, weekly and monthly maintenance schedule. Daily maintenance requires visual inspection of the compressor, noting: cooling water adjustment, oil level, operation and lubricating system, piston rod packing and belts.

For weekly maintenance, men drain condensate from air receivers, drain drip legs in compressed air lines.

Monthly maintenance calls for cleaning of air intake filters on compressors, checking belts for tightness.

Fig. 5. One man spends his full time on the lubrication of plant equipment. Here, he checks reservoir of drill press

Fig. 6. The control panel of a flame hardening machine, used to heat-treat gears, receives its regular maintenance check-up



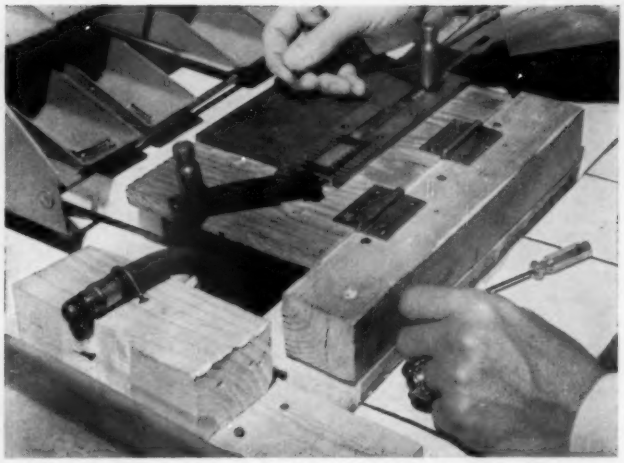


Fig. 1. Screw positioner, above, for tiny screws makes worker's job easier in assembly of small parts for electronic computing machines

Fig. 2. Jig for assembling outboard motor starters was designed by students at Thayer School of Engineering, Dartmouth College

Industrial Problems Go to School

WORKERS ON the assembly line of a manufacturer of electronic computing machines have been juggling 10 tiny pieces of type and six screws, picking them up individually, with tweezers, and painstakingly placing them in a special housing.

This operation was simplified, and at a company saving of $8800 in the first year alone, with a screw-positioning device developed by two students at the Thayer School of Engineering at Dartmouth College, Hanover, N. H.

This is just one example of the many work simplification ideas that have helped industry in its constant search for improvement of working procedures.

In the Work Simplification Laboratory, conducted by Prof. George A. Taylor, students analyze industrial operations that have been troubling manufacturers. They then design jigs and fixtures that will simplify the job and thus make the operation more effective.

During their Christmas vacation, just before the course begins, students canvass businesses and industries in their home towns, seeking real problems that are stimulating and need solving.

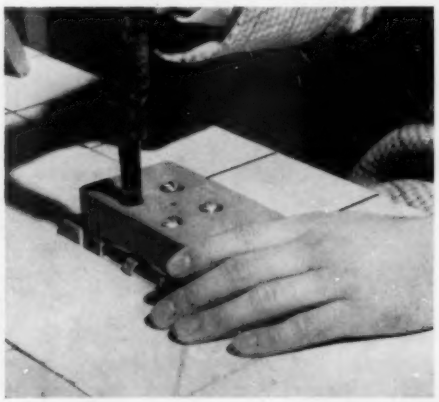
They return to the school with detailed information on the problems. Working in conjunction with company officials and workers, who supply advice, counsel and detailed motion studies of their own, if they have any, the students work out their own solutions.

After the group of student engineers have made an analysis of the company's old method of performing an operation along with the new method, they produce a motion picture of their process in action and make a report to the company.

This report explains the advantages and disadvantages, both to the worker and the company, of changing the existing process. The probable cost of the changes proposed and an estimate of annual savings in production cost are discussed in the report.

Fig. 3. Two boxes can be closed at one time with this device. It increased productivity some 40 per cent and cut cost of packaging almost in half

Fig. 4. Electrical switch test block redesign permits one-man assembly in this upside-down jig



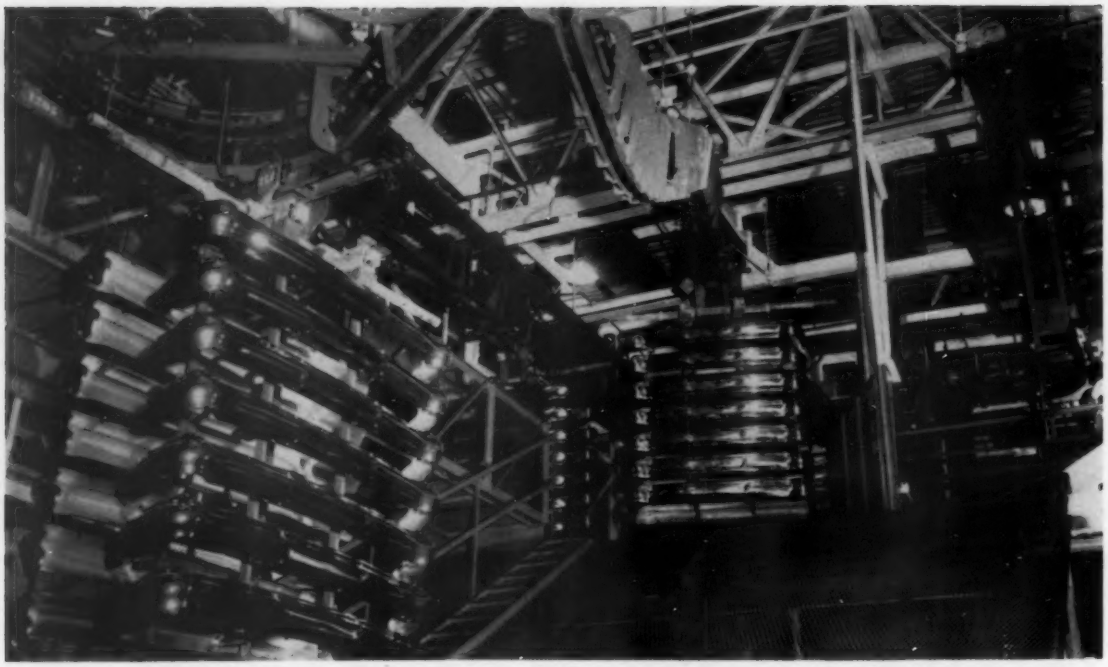


Fig. 1. Several conveyors converge at this point, commonly referred to as "Grand Central Station." There are seven transfer points at this junction. Control system automatically directs bumpers to their respective conveyor lines

Plating Line Fits in Tight Space

Conveyors and Controls Direct Bumpers Through 15 Operations

THROUGH THE use of a power and free conveyor system Oldsmobile obtains a high degree of flexibility in its Lansing, Michigan plant.

There are three outstanding features of this installation. 1. Compactness of the conveyor system within the plating plant. 2. Extensive use of automatic controls. Switching, rack selection to either storage or plating, transfer from one operation to another and coordinating flow through 15 stages are automatic and contribute to the efficiency of the system. 3. A large volume of bumpers are handled by this one system without delay, bottlenecks or production problems.

More than 11,680 ft of conveyor lines are used in the bumper plating plant. This intricate conveyor system, composed of 20 conveyor lines, is divided into two main parts, the copper-nickel and the chrome systems. The copper-nickel electroplating rack holds 14 bumpers; the chrome rack holds 10 bumpers. Racks are transported by a hook type load bar to various automatic transfers for bumper plating processes. The maximum weight of the loaded rack and load bar is approximately 1600 lb.

This conveyor system, designed by the Jervis B. Webb Co., incorporates 29 lift sections in four main varieties: the two-position, the three-position, the offset and the rotating type. These are two-speed lifts having a speed change from 35 to 140 fpm.

The supporting structure for the entire conveyor system was installed in a relatively restricted floor space, making it necessary to locate the conveyor lines in tiers rather than in a single plane.

Tightly Designed System

Bumpers are conveyed through 15 separate operations in one of the tightest designed systems possible to imagine. At some places, as one line passes another, only a couple of inches clearance is provided between cathode bars supporting bumper racks. During the course of travel, the bumpers are automatically conveyed through 75 tanks in the washing and application of copper, nickel and chrome plating.

One hundred and seventy-five control panels are used to synchronize the entire operation. In addition, one master control board 21 ft long visually pictures the entire system in three-dimension type layout. This panel is wired directly to each and every operation within the plating plant.

Another unique control feature is the individual control selector switch on each load bar. At various stations throughout the plant, spotters can set the dial on these switches for proper process travel of the load bar and rack. Throughout the conveyor lines, hundreds of limit switches have been installed for automatic control switching of the racks onto accumulating lines for controlled storage and feeding of the racks into the system. The complicated control system was designed and installed by Control Engineering Co.

Because the system is so extensive and subject to interrupted flow cycles and operational problems which may arise, the central automatic control system is supplemented by a group of patrol operators. A typical example can be found at the plating tanks where three operators are on constant patrol —one watches loading, one observes unloading, and one is stationed on the balcony. They are in constant communication by telephone with central control to report any trouble. This

Fig. 2. Intercom system permits close contact between the various operations

check of the plating process is important because of the possibility of a bumper or some portion of the racks becoming dislodged and dropping into the tanks. Thus, in event of any trouble, conveyor lines are quickly stopped before extensive damage is done.

After the bumpers go through the various press operations, they are loaded onto overhead conveyor carriers to begin their journey through the plating plant, beginning with the welding and grinding department. Following welding, metal flash is removed by grinding and surfaces are smoothed. Before plating can begin, the bumpers must be washed to remove metallic dust accumulated during the grinding operation. They are conveyed on a four-inch overhead conveyor through a cleaning washer and then routed to a hand-pushed free-rail conveyor.

At this point, the bumpers are manually transferred at floor level to a front or rear bumper plating rack. The loaded rack is pushed manually onto a three-position type run-out lift. The lift operator sets the carrier selector switch for routing to copper plating, and pushes the lift "up" button. The carrier is elevated to the third conveyor level where it is automatically transferred to the power and free conveyor. Loaded racks with bare metal bumpers move onto the run-out lift one by one. Each rack is lifted to the bank on the third tier out of the way, ready for the copper plating operation. The copper plating machine is approximately 360 ft long, and takes one rack of 14 bumpers every 163 seconds.

When the rack reaches the end of the plating bath, it is unloaded automatically. An interesting feature of the rack is that it is made of solid copper and is used for the transmission of electrical energy while the racks are submerged in the plating tanks.

After the copper plating operations, the racks are conveyed to the main floor buffing area. At this level the bumpers are highly glossed before undergoing a copper-plating inspection.

Along the downward travel of the copper-plated bumpers, there is an interesting junction of conveyors called "Grand Central Station" consisting of seven transfer points. Selective controls separate the carriers automatically to their respective conveyor lines.

After the inspection cycle, the operator turns the selector switch to nickel plate and pushes the lift eject button. The lift moves up, rotates 180 degrees and moves slightly higher, engaging the conveyor track and the rack is ejected onto the power and free conveyor. Another rack is transferred onto the lift simultaneously for the next repeat cycle.

Racks leaving inspection travel to an accumulating conveyor storage area where they await pick-up and conveyance into the nickel plating machine. Once again, when leaving nickel tanks, the rack is automatically transferred back to the power and free line. From there it is moved to nickel inspection.

The racks leave inspection and are lowered in one of the lift sections to a storage area. At this point the bumpers are manually transferred from 14 unit racks to 10 unit racks. They are then picked up and moved along the line toward the chrome plating tanks. This is accomplished by full use of the power and free principle. Some of the racks proceed direct to chrome plate while others switch to a free line to await their return. This selection is all done automatically by the conveyor system.

When the racks begin their movement to the chrome tanks, they are automatically rotated, lifted and transferred to the power and free line which carries them to chrome plating. At the entrance to chrome tanks, they are again transferred by an automatic device to the plating machine roller chain line that carries them through the plating tanks.

Following chrome plating, the bumpers are eventually conveyed to stress relief ovens operating at 550 F. These are located at building roof level. After this operation, there is final inspection, packing and shipping.

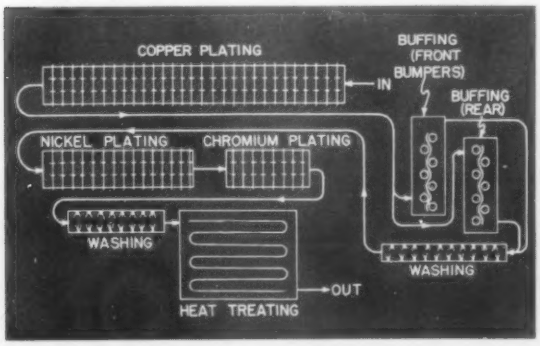


Fig. 3. Sketch shows the layout of the conveyor system and how bumpers travel to plating, buffing and other operations

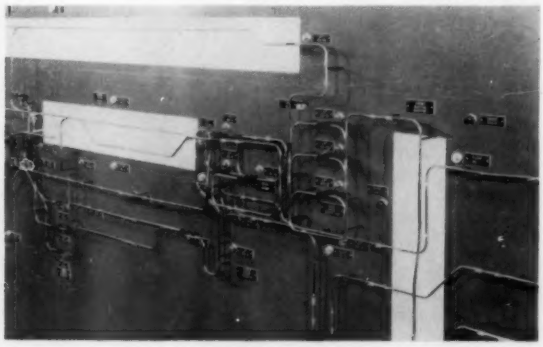
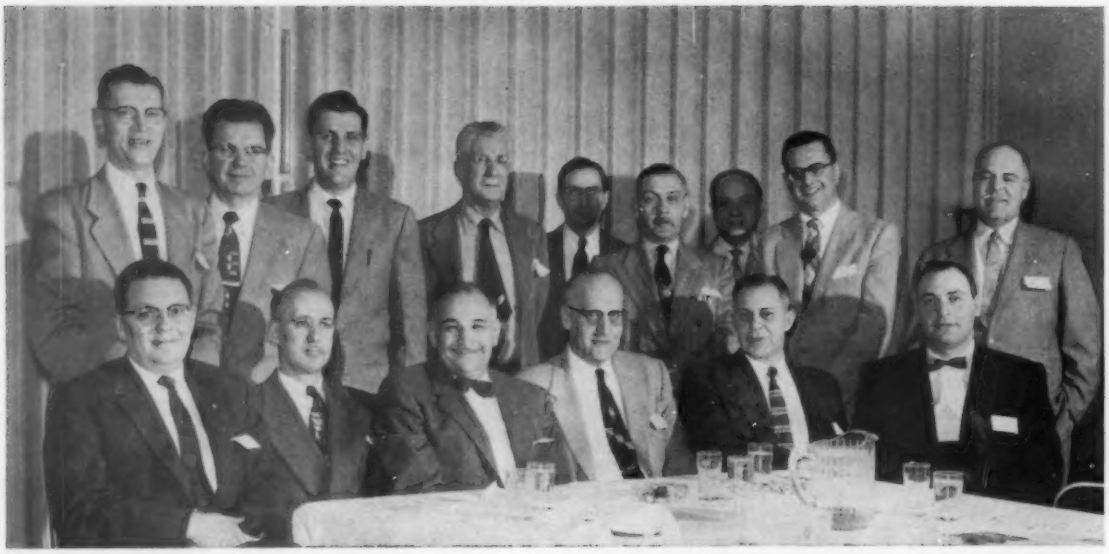


Fig. 4. One section of 21 ft long by 6 ft high control panel. Lights identify stations; when lit, they indicate trouble



Plant engineers from the Buffalo area attended an informal dinner meeting on Tuesday, March 20, to form the Buffalo Plant Engineers' Society and become a chapter of the national organization—American Institute of Plant Engineers

Buffalo Becomes Chapter 29 of AIPE

Other Chapters of the AIPE Report on Their Recent Meetings

ANOTHER CHAPTER has been added to the long list of Plant Engineers' Societies that have joined the national organization. Buffalo becomes Chapter 29 of the American Institute of Plant Engineers.

On March 20, eleven plant engineers from the Buffalo area, met at the Sheraton Hotel to organize the Buffalo Plant Engineers' Society.

Bob Hiller, Plant Engineer, Dravo Corp., Pittsburgh, and President of the AIPE, was present along with Dick Morris, past president of the AIPE and Editorial Director of PLANT ENGINEERING, to answer any questions about the American Institute of Plant Engineers. Hank Loewer, President of the Niagara Frontier Plant Engineers' Society, was also present. He gave a brief account of the experience his group had in organizing the Niagara Frontier.

Men identified in the picture above, seated, left to right, are: R. W. Hofner, Buffalo Forge Co.; H. W. Wollenberg, Buffalo Weaving and Belting Co.; M. Ryen, Curtiss-Wright Corp.; S. Stickney, American Radiator & Standard Sanitary Corp.; H. A. Dreyer, Fedders-Quigan Corp.; and J. V. Tripoli, of J. V. Tripoli & Co., Inc.

Standing, left to right, are: A. J. Smith, Niagara Machine and Tool Works; M. L. Simpson, General Mills, Inc.; W. R. Trautman, Cornell Aeronautical Laboratory, Inc.; R. H. Morris, Editorial Director, PLANT ENGINEERING; L. Goldman, Coverall Service & Supply, Inc.; T. J. Galvin, Rugby Knitting Mills; R. L. Marinello, PLANT ENGINEERING; H. O. Loewer, Moore Business Forms, Inc., Niagara Falls, N. Y.; and R. W. Hiller, Dravo Corp., Pittsburgh, Pa.

Tim Galvin, plant engineer at Rugby Knitting Mills, was appointed temporary chairman. He will also serve as chairman of the Constitution Committee. Members of the Constitution Committee will be: A. J. Smith, M. Ryen and W. R. Trautman. H. W. Wollenberg was appointed temporary secretary-treasurer.

Future meetings of the group will be held on the last Tuesday of each month. At their next meeting they plan to discuss the constitution and outline programs for future meetings.

Members of the Boston Plant Engineers' Club listen to guide's explanation of metals finishing operations during their tour of the Rockwood Sprinkler Co.

Northwestern Ohio

Letters from the Society of Plant Engineers of Northwestern Ohio are carrying the symbol which is reproduced here.

We have published a number of these symbols from the various clubs. If you have recently adopted one for your group, kindly send it to us.

Kentuckiana

Tour of the new Ford Plant on Grade Lane was on the schedule of a recent meeting of the Kentuckiana Plant Engineers' Society.

Before they began the tour, the group held a business meeting at the Kentucky Hotel. Following the business meeting, the club president, P. J. Sehlinger, had the members introduce their guests.

After the business meeting the group

went out to the Ford plant where Barney Murrell, charter member and plant engineer at this plant, conducted them on a tour of the plant. They were also shown a film on the plant's operations.

Boston

Members of the Boston Plant Engineers' Club spent an interesting and informative evening touring the facilities of the Rockwood Sprinkler Co., Worcester, Massachusetts.

In touring the plant, the group learned how the many parts that go into automatic sprinklers and other fire protection systems are manufactured.

Mohawk-Hudson

New officers were recently installed in the Mohawk-Hudson Plant Engineers' Society. For the following year, M. S. MacKenzie, of Behr-Manning Div. of Norton Co., will serve as president; W. T. Carpenter, Cluett-Peabody & Co., Inc., will be vice president; C. W. Felter, W. & L. E. Gurley, will be the secretary and K. T. Krantz, Jr., Sterling Winthrop Research Inst., will be the treasurer.

At this meeting, Dr. C. M. Suter, Director of Chemical Division and Associate Director of the Sterling Winthrop Research Inst., was the guest speaker.

New York

At the February meeting of the Plant Engineers' Association of Metropolitan New York, the members discussed such subjects as: Budgeting Plant Engineering Manpower; Cost Saving Ideas and Suggestions in the Maintenance Department; and Control of Work Orders Through the Maintenance Department, just to mention a few.

Actually, members attending this round-table discussion meeting were asked to be prepared to discuss something from a list of 19 different subjects. However, this did not require too much preparation since all the plant engineer had to do was bring the engineering problems that confronted him that day.

Los Angeles

Members from the Plant Engineers' Society of Los Angeles heard an interesting talk from Mr. Stewart Tongret, on the subject: "Applications of Standardized Electronic Equipment in Industry." Mr. Tongret is Director of Electronic Research at Hancock Industries, Los Angeles.

Results of their recent election were also announced at this meeting. A. W. Linton of North American Aviation, is the new president; C. A. Gallaher of the Aeronautical Div., Robertshaw-Fulton Controls Co., is vice president; H. M. Eversz, McCulloch Motors Corp., secretary; and W. F. Gaber, Pabst Brewing Co., treasurer.

AIPE's 1000th Member

—J. R. Merrill

An important milestone in any organization, the signing of its 1000th member, has been observed by the American Institute of Plant Engineers.

When the Merrimack Valley Chapter organized on January 9, one of its members, J. R. Merrill, was Member 1000 of the AIPE. Incidentally, he was also elected to the vice presidency of the local group at this organizational meeting.

Plant Engineer at the Nashua, New Hampshire plant of the J. F. McElwain Co., shoe manufacturers, Bob advanced to this position in 1954, after spending two and one half years as Assistant Plant Engineer. A graduate of the New Hampshire Technical Institute, he is responsible for the maintenance of thirteen plants, located in Nashua and Manchester, New Hampshire and Athol, Massachusetts.

Included in his responsibilities are the safety program for the company, all new construction, plant layout, and purchasing of all engineering materials. The watchmen, firemen and guards also function under his direction.

Jim Armstead, retiring president, Mohawk-Hudson Plant Engineers' Society, shakes hands with new president, M. S. MacKenzie. Other people are, l to r: W. T. Carpenter, Dr. C. M. Suter, MacKenzie, Armstead, C. Felter, K. Krantz

Mounting Anti-Friction Bearings

Correct Accessories, Parts and Tools Are Important

Even the best of ball or roller bearings won't work if it's damaged during installation . . . Author describes tools and methods for proper installation . . . Cleaning is important, too

By E. P. STAHL, Garlock Packing Co., Palmyra, New York

ALTHOUGH A WEALTH of information exists on the basic types of anti-friction bearings — ball and roller—such information is not always available about the parts and accessories used with the bearings, and about the tools used in installing them.

To assist engineers and bearing users in securing the maximum efficiency and reliability from any bearings they might use, this article is intended to illustrate and describe some of the parts and accessories in use.

Lock nuts are among the most common supplementary devices or accessories used to hold ball and roller bearings in place on shafts. The threads in these nuts should be concentric with those on the shaft, and the face of the nut which abuts against the bearing should be machined at a right angle to the shaft to insure a good holding. Nuts are tightened against the bearing race and are prevented from further turning by prongs on the lock washer, which are bent into recesses in the lock nut. Simultaneously, the internal key projection of the washer is held in the splined keyway in the shaft. See Fig. 1.

Some shafts on machine tools and similar equipment using tapered roller bearings require double lock nuts in order to provide adjustment for preloading the bearings. Recently, self-locking nuts have become available as purchased units, removing the need for the usual lock washer, and simplifying assembly of ball and roller bearings on shafts.

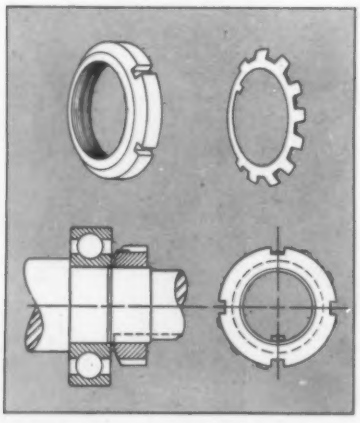


Fig. 1. Lock nut and lock washer, shown as individual units, and in place on shaft

An alternate device for holding lightly loaded bearings in place on a shaft or in a housing is the retaining or "snap" ring. These rings are available as purchased units in two general types—internal and external, as illustrated in Fig. 2.

The internal ring is designed to be compressed in assembly and snapped in an annular groove in the bearing housing; the external ring is expanded over the shaft and snapped in an annular groove in the shaft. Various forms of external and internal snap rings are available, to suit any particular installation conditions.

In some special cases, flexible washers or packings are used between the bearing and snap ring, as indicated in Fig. 2. Bowed retaining rings, which take the place of the flexible washers and at the same time act as retainers, may also be used.

Even though ball and roller bearings often are pressed on shafts, it is sometimes advisable to use snap rings as an extra safety provision to keep the bearings from working off the shaft.

In applying snap rings to shafts and housings using ball and roller bearings, it is well to note that the allowable variation in dimensions of both ring and groove is such that a play of 0.0005 in. to 0.017 in. exists. Such small tolerances are not serious, but at higher speeds, if wobble becomes troublesome, the use of beveled or bowed retaining rings, as shown in Fig. 3, which take up the tolerances, are recommended. The use of beveled and bowed rings prevents wobbling, cocking of the inner bearing ring and bending of the shaft—conditions usually identified on a steady run test by heavy vibration.

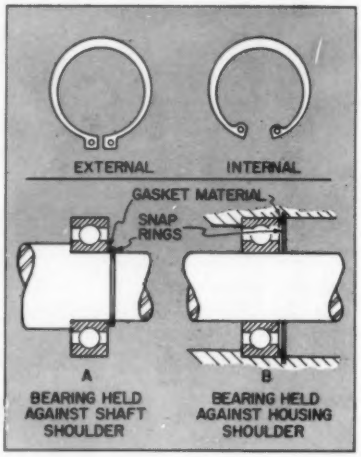


Fig. 2. Snap rings, installed with gasket material, hold bearings in place

Some design engineers have designated split snap rings "artificial shoulders," which they are. Where these units can be conveniently used they result in fast and easy assembly and economical construction.

The use of internal and external split snap rings with ball and roller bearings requires cutting a locating groove in the shaft or housing. Precision cutting of internal recesses in bearing housing bores has always posed a difficult and time-consuming problem where retaining of bearings is involved.

Operations on lathes or boring mills, the two types of machines generally used for cutting snap ring recesses or grooves, are expensive and have certain limitations. These limitations and production obstacles have been mitigated to a large extent by the use of a grooving tool designed for precision cutting of concentric grooves or recesses in bearing housing bores. With this tool grooves may be cut in housings and shafts conveniently and economically even by unskilled operators.

Although not used expressly for the purpose of fastening bearings to shafts or in housings, another bearing acces-

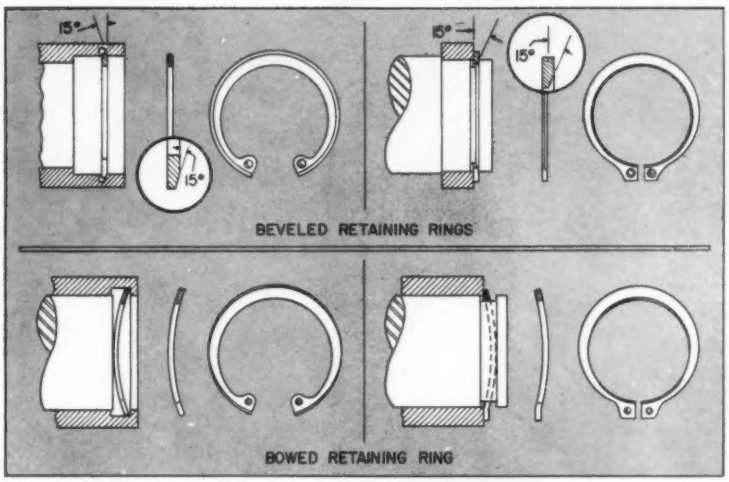


Fig. 3. Beveled and bowed retaining rings, both internal and external, as applied

sory should be mentioned. This accessory, a preloading washer, is shown in Fig. 4. The stresses put into the washer by the "waves" are used in special applications to counteract vibration at high speeds and to minimize noise, excessive wear and end play.

These washers offer exceptional value in cases of unavoidable loose internal clearances, where ball bearings are required to meet speed applications.

Bearing Mounting Tools

Tools for mounting and removing bearings from shafts and housings are an important phase of this discussion. One typical tool for this purpose is an arbor press, shown in Fig. 5. When mounting a bearing with the press, a pipe of diameter such that it bears on the inner race only should be used. The bearing should be started square, and pressed solidly against the shoulder which positions it on the shaft. When forcing the bearing into place, pressure should be fairly uniform. If the bearing sticks, an off-square condition exists, the shaft is oversize, or it contains high spots.

When an arbor press is not available, a bearing may be mounted on a shaft with a pipe and hammer. With this method, too, the bearing should be started square, with the pipe resting against the inner race only. Bearings should be driven solidly against the shoulder by tapping lightly on the pipe, around its periphery.

Several tools for assembling small ball bearings on shafts and in housings are available, as shown in Fig. 6. A female bearing tool has been designed to assist in mounting bearings in instruments and similar equipment where bearing sizes are extremely small. The tool holds the bearing on its outer race, and pushes against the inner race during the installation of the bearing on a shaft or to pull it off the shaft for inspection or cleaning.

The male assembly tool has a stub shaft over which the bearing is fitted for pushing it into a machine housing. Both male and female tools can be used as light duty pullers, for removing small bearings from instruments.

These tools hold small bearings so that the force necessary to place them over a shaft or in a housing is applied in such a way that the alignment of balls and races is not endangered. Although they were designed primarily for use with small instrument bearings, they are also available for use with larger bearings.

Small ball bearings for instruments and similar applications have all the characteristics of their larger counterparts; however, they must be handled and assembled with extreme care to guard against damage. The use of tweezers is recommended for moving these small bearings from place to place as they are vulnerable to damage from perspiration.

The application and removal of large roller bearings in paper mills, steel mills and similar plants has always posed a serious problem to shop men, especially where interference fits are used. This is particularly true in steel mills, where roll changes are frequent and bearing removals and installations are made on work rolls and backup rolls, during each change.

In the past, to facilitate removal, large roller bearings on hot and cold rolling mills were mounted on the roll necks with a loose fit, which allowed the inner bearings race on the roll neck to "creep" or walk on the journal, scuffing the bearing bore and the roll neck. The resultant sloppiness adversely affected the quality of the work.

(Please turn to page 124)

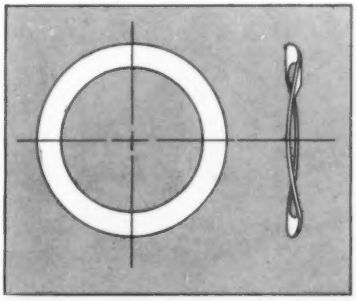
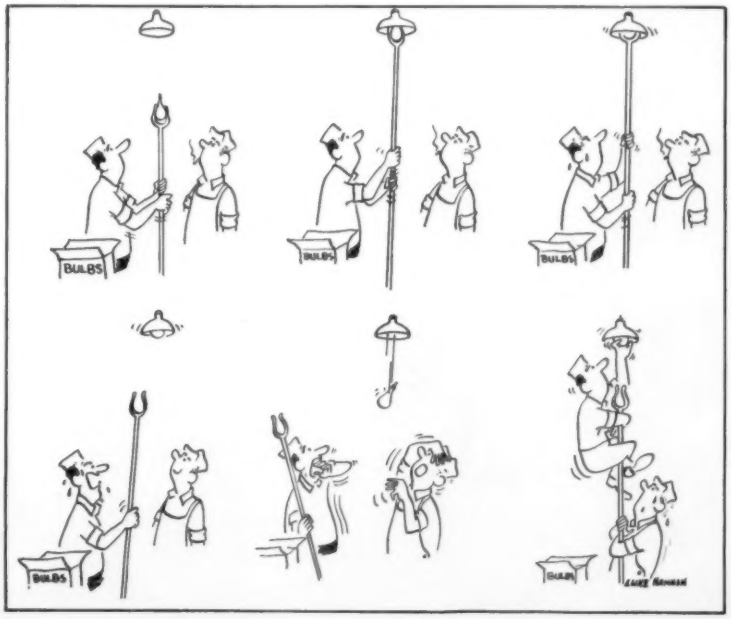


Fig. 4. Construction of "wavy" washer



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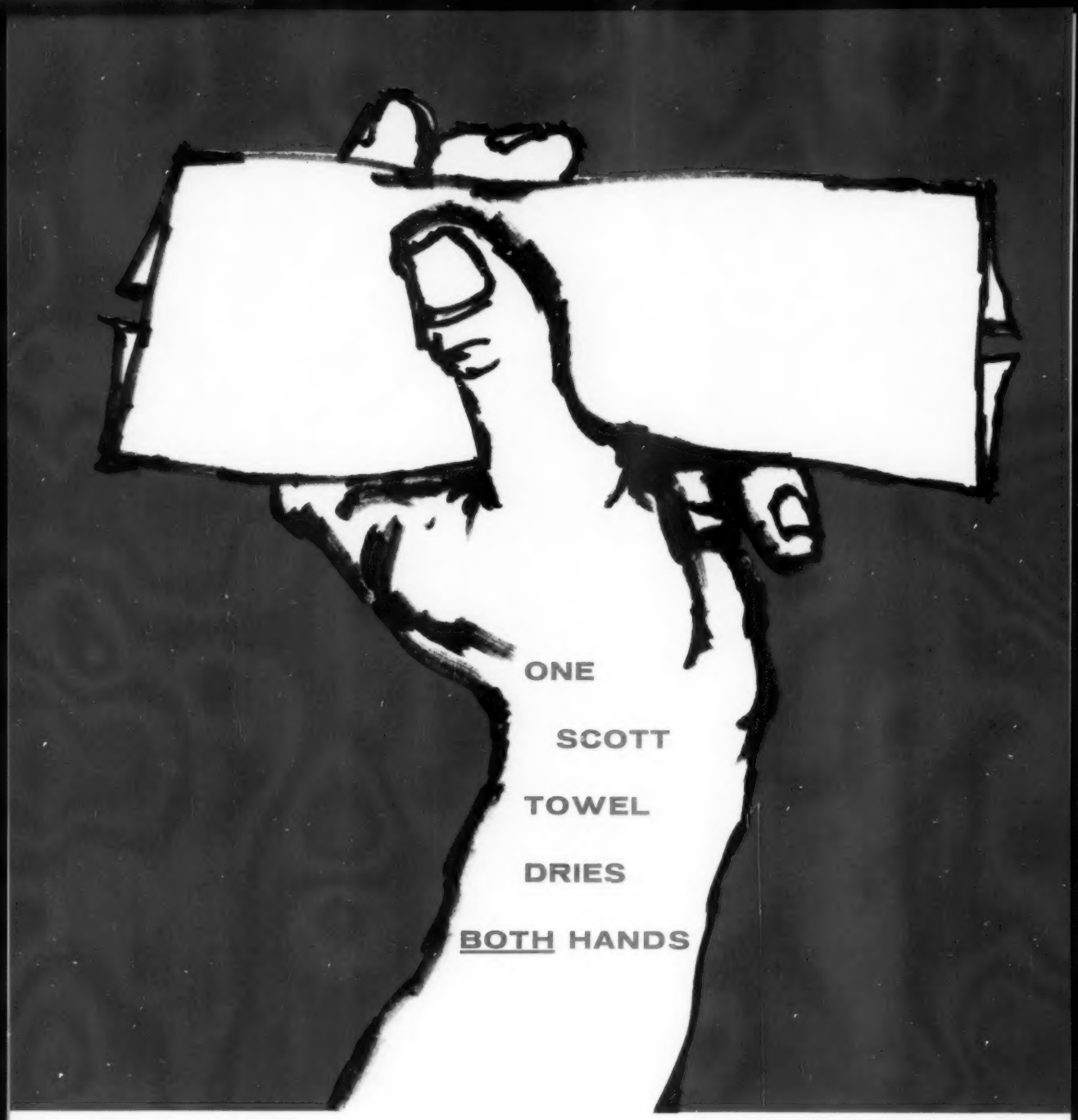

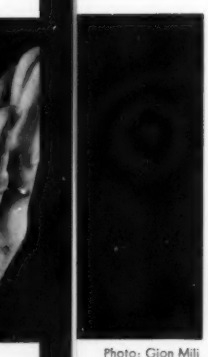

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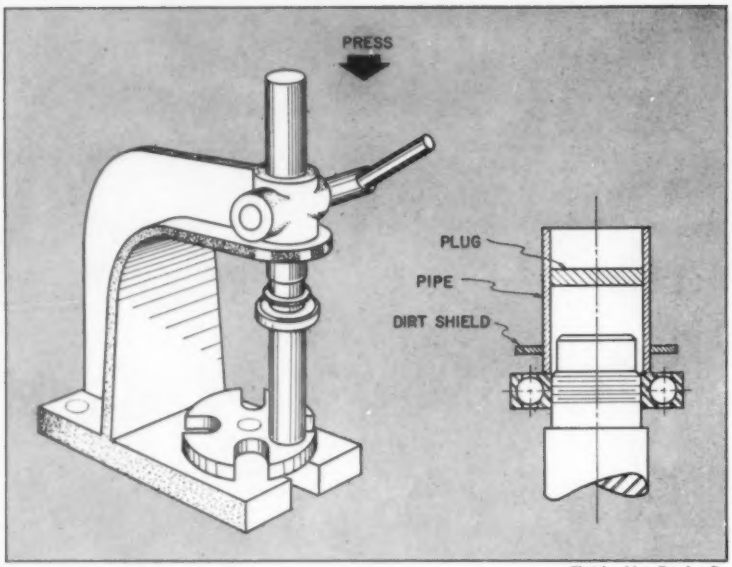


Sketch: Ajax Coupler Co.

Fig. 5. Arbor press, left, as used to mount bearings. Detail of drift pipe at right

Development and use of hydraulic injection system greatly simplifies both the installation and removal of large spherical roller and tapered roller bearings from journals in steel mills and on paper machines.

The system is illustrated in principle in Fig. 7, which shows a mill bearing application employing a spherical roller bearing mounted on a large tapered journal. A simple hydraulic jack supplies the necessary power pressure. Although this system is most advantageously used with tapered-bore bearings, it is also helpful to a lesser extent in mounting and dismounting bearings on straight shafts.

In order to secure the advantages of this system, it is necessary to add oil holes and annular grooves in the journal, as indicated in the drawing.

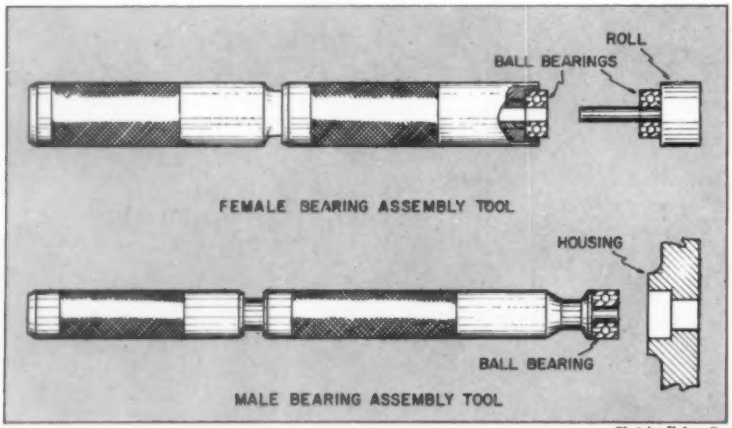
The success of this hydraulic removal system emphasizes the fact that friction between contact surfaces can be almost entirely eliminated with the injection of oil under pressure of 2500 to 10,000 psi, depending upon the specific pieces and their function. When dismounting large roller bearings from journal ends, the oil injection principle accomplishes complete removal of the bearing—a decided advantage where bearings have to be changed frequently.

The method is not, however, economical for removing small or medium sized bearings from shafts, and if these bearings cannot be removed by the hammer and drift pipe method or with an arbor press, a puller similar to that illustrated in Fig. 8 must be used. This type uses a split collar puller plate, the flange of which presses against the inner race of the bearing. The bolts of the puller must be carefully adjusted to equalize the pull all around the bearing race. Pulling pressure is applied by using a long wrench on the puller screw. Tapping the opposite end of the shaft with a light hammer will usually start the bearing.

Figure 9 illustrates a special bearing puller for removing thin shell needle bearings from housings where there is clearance behind the bearing. The tool, contracted, is inserted through and beyond the bearing shoulders, then the expansion rod is inserted to spread the tool behind the bearing shoulders. The whole assembly is then pressed out by a rod, driven from the other end of the bearing housing.

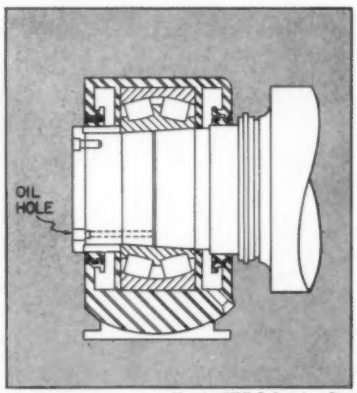
If there is no room behind the bearing for prongs of the removal tool, it is best to cut a notch in the lip of the bearing shell and remove the rollers. The shell or casing may then be removed with one of the prong-type tools, with no damage to the housing.

Figure 10 illustrates an installation tool for a closed end thin shell needle bearing. The plunger presses on the



Sketch: Baker Co.

Fig. 6. Two types of bearing assembly tools. Female tool is used to install bearings on roll shafts, male tool holds bearing for insertion into housing recess



Sketch: SKF Industries, Inc.

Fig. 7. Typical example of oil injection system for roll neck bearing removal

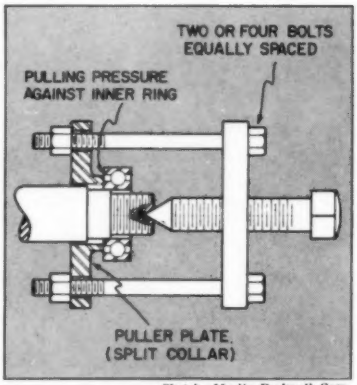


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Fig. 8. Cross section drawing of inner ring puller. May have two, four bolts

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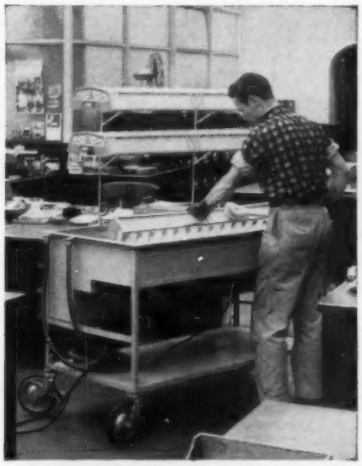

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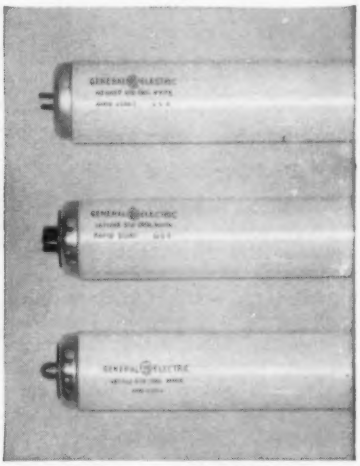

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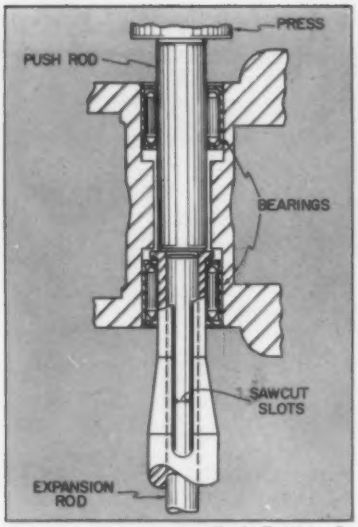

Sketch: Torrington Co.

Fig. 9. Withdrawal tool for needle bearings collapses tube, gets behind bearing

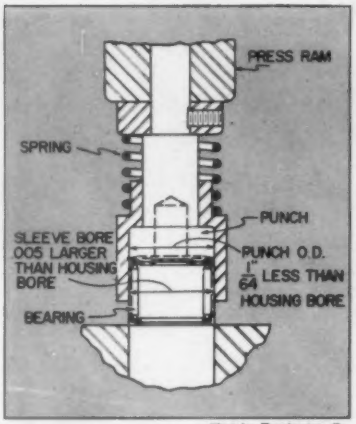

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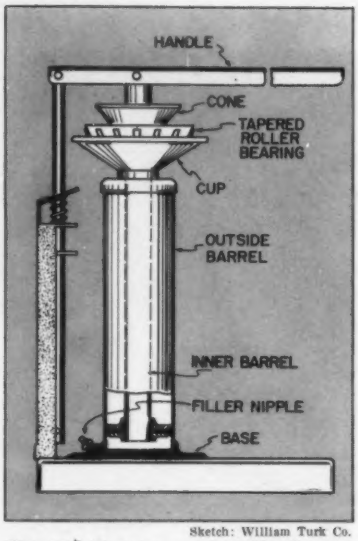
Fig. 10. Installation tool for needle bearing pushes on closed end of bearing



Sketch: William Turk Co.

Fig. 11. Pressure on handle forces grease through inner barrel into bearing

flat surface of the closed end of the bearing, the outer sleeve merely guiding the bearing into place. The spring keeps the sleeve pilot and the bearing in position.

Packing and Cleaning

In addition to handling and mounting ball and roller bearings, consideration should be given to their packing and cleaning. One of the methods used to pack wheel bearings in automobiles and airplanes with grease is illustrated in Fig. 11. This packer, which is available commercially, can be used equally well with tapered roller bearings and ball bearings. To operate it, the barrel is filled with an all-purpose grease, and the bearing to be packed is placed in the cup at the top of the machine. The cone on the handle is placed on top of the bearing, to hold it in place, and the handle is then pressed down, to force grease through the bearing. The bearing is then removed, sliding it off the cup to prevent pulling the lubricant out of the bearing during the removal.

Cleaning of bearings involves the removal of dirt and grease, as well as the removal of preservative compound on new bearings, prior to their installation in a machine.

One of the methods commonly used is to blow the dirt and grease out of a bearing with compressed air, after it has been flushed in clean kerosene. The air supply, which is critical in an operation of this kind, should be cooled and filtered before it enters a receiving tank, from which it goes to the cleaning area. Here, it should pass through a mechanical separator and a filter before it goes to the gun itself. Pressure should be 50 to 60 psi, and the preferred gun would be a two-position device, which will pass clean, dry air with the trigger depressed half way, and will pass air and solvent in a spray, when the trigger is fully depressed.

Figure 12 shows one installation of using a spray cleaning technique on ball bearings. A metal hood, fabricated to confine the spray from the cleaning gun, is fitted with an open mesh screen against which the bearing is supported during cleaning.

To eliminate the spattering often associated with this spray method, a bearing cleaner has been designed to confine the greasy lubricant-solvent mixture to a can or metal container. With this cleaner, the bearing is inserted and clamped to the under side of the cleaner cover. A revolving plate, placed on top of the cover is drilled to receive the nozzle of the air hose. In use, air is blown through the opening, which revolves over the bearing rollers and races. The air moving past the bearing carries away the grease and solvent, depositing it in the can for ultimate disposal.

This cleaner is used by an airplane manufacturer to remove the preservative compound applied to new bearings by the manufacturer. It is, however, equally effective for cleaning bearings that have been in service.

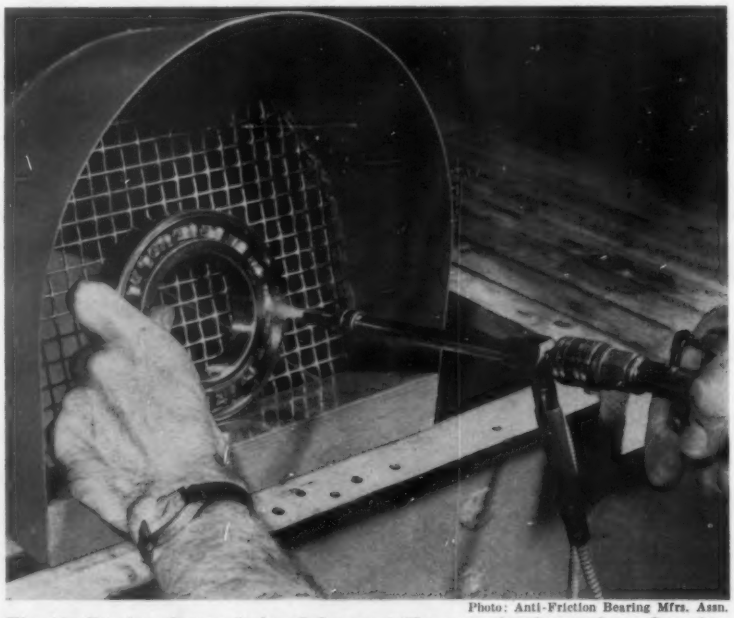


Photo: Anti-Friction Bearing Mfrs. Assn.

Fig. 12. Bearing cleaner designed for use with spray cleaning system. Operator, adjusting trigger, sprays bearing with solvent-air mixture, or clean, dry air

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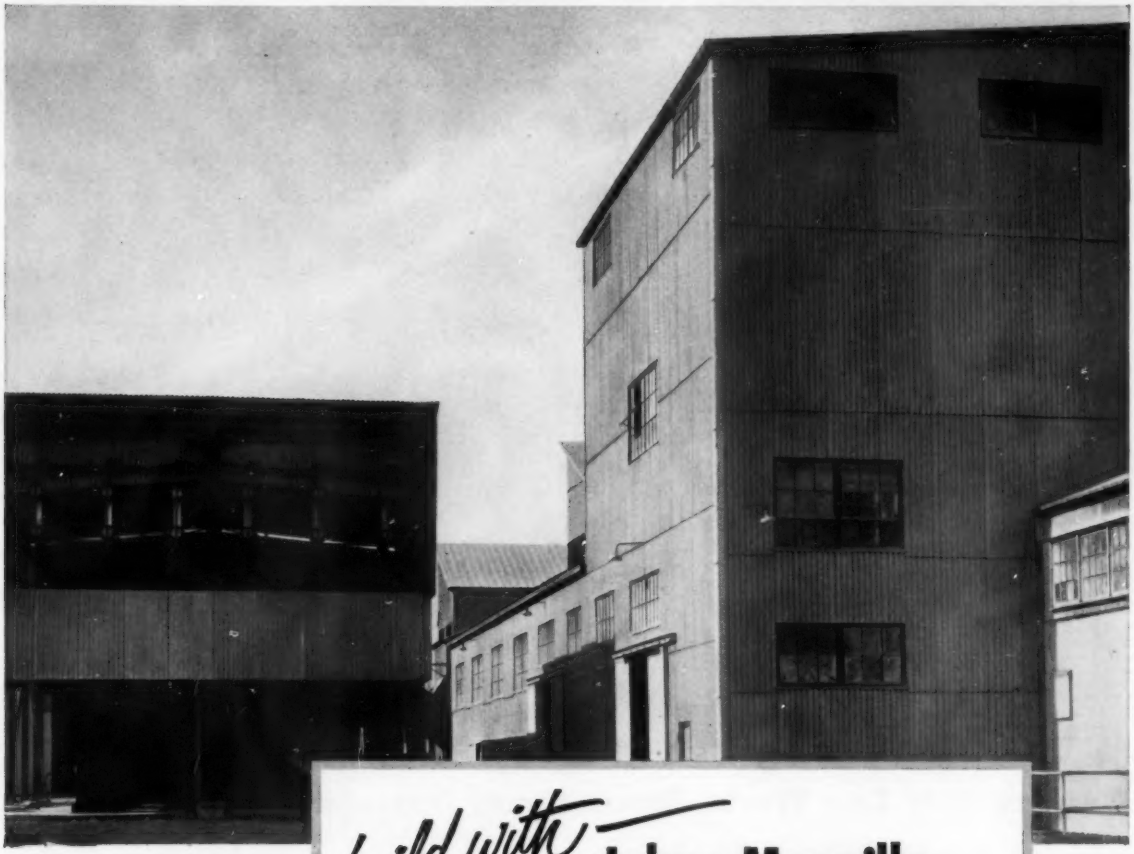

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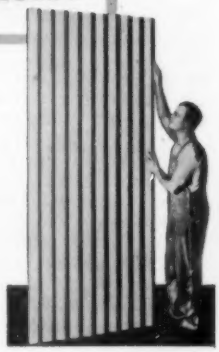

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Close-up view of television receiver at Spotswood, N. J. plant of Peter J. Schweitzer, Inc. Pressurized, transparent case enclosing camera assures clarity

Operator watches gyrations of pulp washing machine as they are recorded on closed-circuit TV system from vantage point in building situated three stories below the pulp machine

TV Turns Eye on Paper Making

Camera Cuts Leg Work, Down Time, Operator Fatigue

PETER J. SCHWEITZER, Inc's. Spotswood, N. J., plant is the home of one of the world's largest manufacturers of cigarette papers. Although it is a large plant, it has a comparatively small staff of workers. Due to the nature of the operation, the complexity of controls necessary, and many variables which can slow up or stop production, necessity for keeping an eye on processes at all times is a distinct "must".

It was this need that led Louis P. Schweitzer, head of the firm, to consider installing a closed-circuit television system in the mill.

Consultations with Plant Manager Charles Petzold led to the selection of an area in the Stock Preparation Department for the electronic test.

Just a few months ago the installation was completed. Schweitzer's is one of the first industrial television systems to be set up in the state of New Jersey. Already the results have been so fine, that officials are considering extensions and amplifications of the original system.

The Stock Preparation Department prepares flax fiber for its eventual conversion into fine cigarette paper. Equipment here runs from one floor to another. The stock, or paper pulp, is pumped from the ground floor up to the third floor over a dewatering machine. It is this machine that has become the "star" of the Schweitzer TV "show."

In this machine, the stock is washed preparatory to bleaching. The pulp mass falls into a washing tank where a revolving drum tumbles it around to remove excess water.

This operation is an important step in Schweitzer's entire process of fiber preparation. Any hitch at this point not only causes delays in time and production at the dewatering machine but also results in delays telescoping out all the way from pulp preparation to the manufacture of the paper itself.

Occasionally, what happened was that the pulp piled up and jammed the drum. When this occurred, the whole tank had to be emptied and cleaned before operations could be resumed.

Such expensive jam-ups didn't happen too often. But as Melvin Shure, Supervisor of the Stock Preparation Department says, "If the pulp-preparation tank plugs up once, it's too often."

Prior to the television installation, constant watch on the dewatering machine was kept by an operator whose main station was on the ground floor level. Maintaining this vigilance meant that at a maximum interval of every half hour, he had to run up two flights of stairs to the dewatering machine and check. The Schweitzer operation is a 24-hours-a-day, 7-days-a-week operation.

Since these men were taken away from their main post for at least ten minutes out of every hour, the waste of energy, efficiency, and time was considerable.

When RCA came along with its "TV Eye" closed-circuit system that could provide continuous remote observation of the potential trouble spot, Schweitzer officials decided to give it a try.

The installation is a comparatively simple one, including only a camera and control unit, plus a television monitor. Technicians set up a television camera, no bigger than the one you take home movies with, on a shelf a few feet above and away from the pulp washing machine. The camera is connected via closed-circuit to a television monitor located on the ground floor, close to the operator's main station.

Closed-circuit TV differs from commercial TV in that signals come directly through a coaxial cable, from camera to receiver. These are not broadcast, and there is no sound.

As the dewatering screen churns up the pulp, the television camera makes a continuous photographic record. This is flashed on the receiver

(Continued on page 198)

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For more facts circle 571 on Reply Card

Safety Training Begins Before Job At Ford Plant

Inspection of new device by employee, supervisor and plant engineer, helps promote general plant safety

THAT THE SAFEST possible working conditions and close adherence to safety rules must be maintained at all times, is considered of prime importance at the Ford Motor Company stamping plant in Buffalo, N. Y. As the basis for an effective safety program, each employee is selected for a particular job after careful screening to establish his general fitness for it.

When the new employee first reports for work, he receives an indoctrination talk. The nature of his work is explained, company regulations are reviewed and safety rules are emphasized. He is given a booklet containing the safety rules governing the department in which he will work and instructed to read the rules carefully. In three days' time the employee signs a slip acknowledging that he has read the rules and will be guided by them. His supervisor checks his knowledge of these safety rules.

The company enforces rules covering the wearing of safety glasses, hand pads and wristlets, which it furnishes without charge to the employee. The recommendation that safety shoes be worn is stressed constantly. Purchase of safety shoes is made easy through payroll deduction and prescription lenses are available at reduced costs.

New employees are shown the location of tool cribs, lockers, the cafeteria and time card racks. In every possible way these people, who are new to Ford, are made safety conscious and encouraged to cooperate and abide by the rules of the company.

After the time spent in this orientation program the new man is further instructed by his supervisor, who follows a four-point program:

1. The employee is taught why an operation is done.
2. He is shown how it is done.
3. He is allowed to do the operation himself under the supervisor's instructions.
4. His work is followed closely by the supervisor until he is thoroughly acquainted with the operation.

This program has contributed greatly to the elimination of accidents.

Each day the supervisor meets at least two employees in his department and spends a minimum of five minutes with each of them, discussing safety. Questions may be asked, difficulties eliminated or new methods and equipment explained.

On the first Tuesday and Wednesday of each month there are 10-minute talks on safety in the cafeteria after the lunch period. The speaker may be a member of management or a guest.

Safety Talks

During the third week of each month each supervisor meets with his employees as a group and gives them a 10-minute talk on safety. These talks cover a wide field—plant mishaps, a review of recent accidents, statements of safety records within the company or nationally, or any number of similar subjects. Employees are urged to participate in these discussions and to ask questions.

Safety engineers are in the plant at all times, identified by their white coats with large red letters across the back spelling out "SAFETY". They are constantly on the alert to detect unsafe acts of employees or unsafe working conditions. Although they have the authority to shut down any job they feel is unsafe regardless of how it may affect production in any of the company's plants, it is seldom necessary.

If an accident occurs that job is stopped at once and a committee consisting of the plant manager, production manager, plant engineer, department head and supervisor involved, meets to study cause of accident.

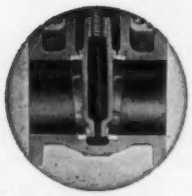
Stressing that good housekeeping and safety go hand in hand, there is a rating system in which neon signs state the housekeeping condition of the area. The signs display three ratings: Excellent, Good or Poor. The Safety Department inspects the plant daily, and rates the various areas accordingly. These signs are on all the time, on all shifts, and help greatly in keeping employees conscious of the factors that make departments clean and safe.

Once a week a four-man committee consisting of three department managers and the safety engineer visits an area and "looks under the rugs," so to speak. These visits are unannounced and serve still further to emphasize management's concern over safety and housekeeping as well as to keep employee and supervision alert to safety and good housekeeping conditions. Reports of these visits are then presented at weekly staff meetings attended by all department managers and the plant engineer.

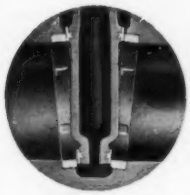
Many engineering problems come to the plant engineering department in connection with the safety program. For instance, to assure greater safety it may be necessary to change designs or planned installation of equipment. A machine may require modification for local adaptation. Whatever is required comes within the province of the plant engineer, who works closely with the safety group. They watch all equipment operations and installations to see that any special safety devices —hand buttons, foot pedals, die guards, etc.—are in proper order to prevent possible injuries. Wherever possible, automation has played a key role in plant safety programs in that it has eliminated unsafe or fatiguing manual operations.

Supervisor, foreman, or general foreman works for a week with safety personnel in their duties about the plant. In this way supervisors get a picture of how their own departments fit into the safety program.

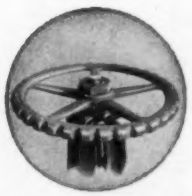
A roving camera man who is a member of the safety group, roams about the plant unannounced, taking pictures of employees working unsafely, unsafe conditions, or poor housekeeping.



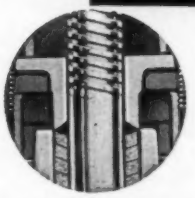
Straight-Flow Port Design reduces fluid turbulence to a practical minimum.



Seat Rings of end-seated type are screwed into the body.



Sure-Grip Malleable Handwheel for non-skid gripping even with heavy gloves.



Brass Liner on Glands assures greater resistance to corrosion and scoring.

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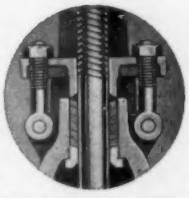
T-head Disc-to-Stem connection on OS&Y types provides stronger connection, prevents loosening of disc by corrosion.

Bronze Back-Seat Bushings in bonnets of OS&Y valves.

Solid Web Type Disc in O valves for greater strength longer service.



Hinged Gland Eye-Bolts on OS&Y valves permit faster easier repacking under full pressure.

For more facts circle 572 on Reply Card

Texas Gets Another "Biggest"—A Maintenance and Repair Hangar

CONSTRUCTION OF THE world's largest maintenance and repair hangar is near completion, according to the designers, the Kuljian Corp., Philadelphia. The $13 million-plus facility at Kelly Air Force Base, San Antonio, Texas, will be the first of its kind to permit maintenance on a simultaneous production line and stall basis.

The entire project consists of a hangar 2000 ft long, 300 ft wide and 91 ft high; an adjoining shop and administration building 1650 ft long and 250 ft wide; and an apron totaling 300,000 sq yds of reinforced concrete slab 16 in. thick, designed to support planes weighing up to 400,000 lb.

The Kelly hangar is divided into five independent bay units of 400 ft each, can admit the largest planes through its 250-ft door openings, and is windowless. The walls of the hangar and shop buildings are of corrugated cement asbestos siding, and roof areas consist of metal decking with 4-ply built-up roofing.

Fire protection equipment includes six motor-driven fire pumps, a deluge type sprinkler system in the hangar area, and a conventional wet head system within fire-wall enclosed areas in the shop building.

Supersonic Testing Calls for World's Largest Privately Owned Air Supply

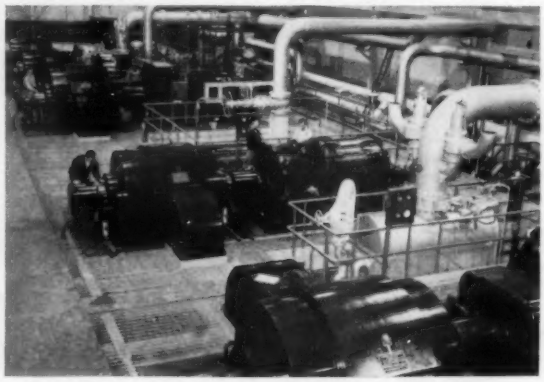
CAPABLE OF SIMULATING supersonic flight conditions for jet engines three times more powerful than any currently in production, a $20,000,000 test facility will be constructed by General Electric Company at their Evendale, Ohio, plant.

A portion of the facilities already in existence at the site include a compressor station, believed to be the world's largest privately owned air supply, which was constructed at a cost of $4,000,000.

Five huge electric motors supply 27,000 hp to drive the compressors, which in turn furnish "hurricanes" of air to combustion, aerodynamic and other facilities for development and testing of modern jet engines.

A major part of the air will go to two high altitude test cells, each having a diameter of 18 ft, in which test engines will be housed. Air will be forced through these test cells at supersonic speeds, to simulate engine flight conditions. The compressors will deliver 100 lb of air per second, at pressures of 20 atmospheres, or 300 psi.

Pressures as low as 1/20 atmosphere, to simulate altitude conditions, can also be obtained, using the air compressors as exhausters at proportionately reduced flow rates. The compressors can be run singly, in series or in parallel to obtain the desired conditions or to deliver air to several test cells at the same time.



Piping Is Tremendous for this Heating Job—Tremendous in Itself

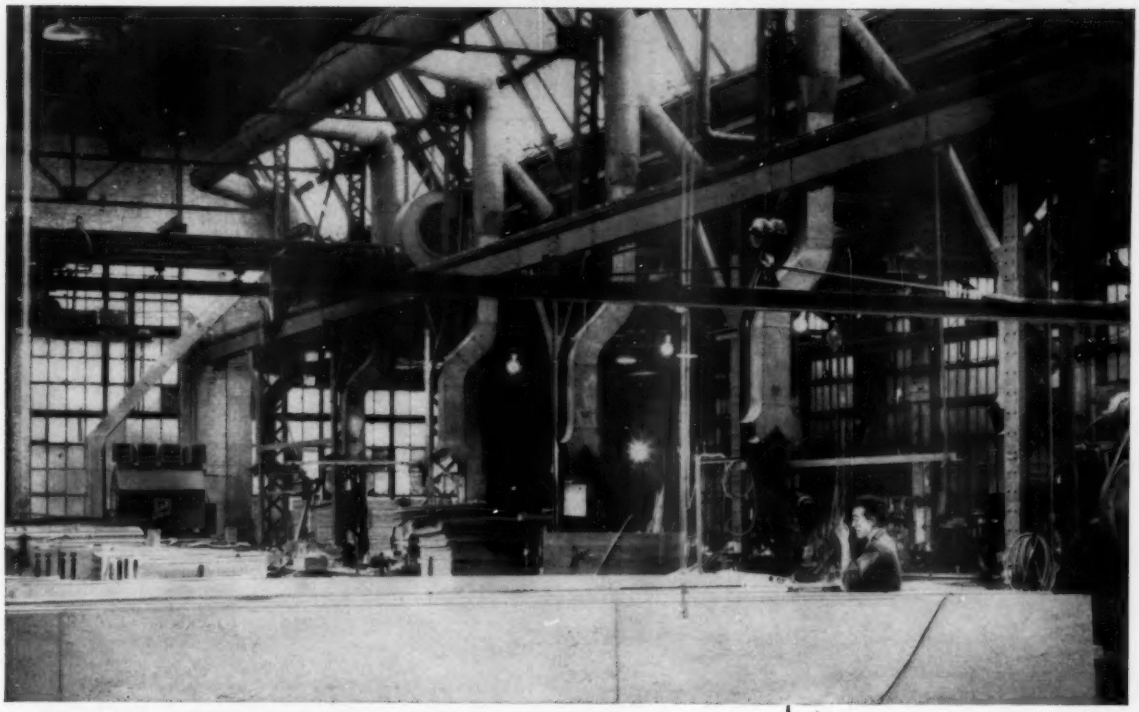
AT THE NEW U.S. Air Force Strategic Air Base, Plattsburgh, N. Y., blasts from across Canada pull the mercury down to 40 below zero at times, and pull the heating load up an equivalent amount. To do the heating job at the base, it was necessary to lay almost four miles of pipe from the power plant to the various base facilities, and specifications called for pipe that would withstand a 600-lb hydrostatic test for six hours.

Jones & Laughlin Steel Corp. supplied 18,482 ft of 14-in., 3/8-in. wall, seamless pipe, in 11 carloads of double random length—roughly 40-ft lengths.

Before the pipe could be welded, it was installed on a four-inch layer of concrete. The welding was "uphill" so that minute bubbles would not be left in the weld.

Insulation for the lines is a mixture of concrete and an exploded mica product, granular in nature. Every 300 ft, loops were fabricated in the line, to cope with the expansion and contraction of the pipeline. At the Plattsburgh base, the loops are 30 to 40-ft U-shaped bends, laid on the same plane as the remainder of the line.

Water will flow in the lines at 400 lb pressure, leaving the powerhouse at 380 F and returning at approximately 220 F, after heating all the base buildings.



Richards-Wilcox more than doubles heating capacity

...cuts heat operating costs in half!

Plant heating problems first began for the Richards-Wilcox Manufacturing Co. of Aurora, Illinois, during World War II. Then, the existing steam plant, operating at full capacity, could not meet the heat requirements for new production areas. Immediate solution was the addition of two warm air space heaters.

Later, a 750,000 btu Dravo *Counterflo* heater was installed to serve additional expansion. But in 1951, facing even more expansion, Richards-Wilcox plant men thoroughly surveyed their total plant heating problem.

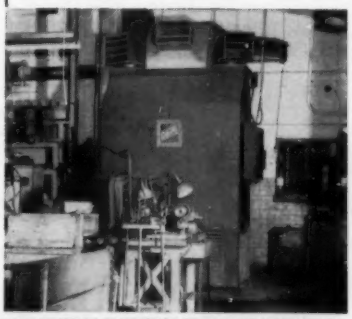
The existing boiler had to be modernized, an additional boiler and accessory equipment had to be added. Operating costs of this contemplated step were discouragingly high! Experience with space heaters suggested an alternative that promised real economies—dismantling of the steam plant and converting the entire plant to warm air heating. This plan was adopted on a 3 year basis.

From 1951 through 1953, twenty-four Dravo *Counterflo* heaters were put into service. Richards-Wilcox personnel installed recording instruments on every unit to determine fuel consumption and efficiency. After two years of service, the records show that Dravo heaters provided more than enough heating capacity for complete worker comfort and had *cut operating costs to less than half of the former system.* Service costs, too, were 50% less than anticipated.

Such economy is only a part of the many exclusive advantages Dravo heaters can bring in heating your plant, warehouse or building. It will pay you to thoroughly investigate quality Dravo heating systems—and see the dollars and cents reasons behind every feature. For prompt information, mail the coupon today.

▲ This Dravo *Counterflo*, on the far wall, distributes heat up to 150 feet away. Richards-Wilcox's complete Dravo system of 25 units provides 21,700,000 btu per hour to a 6 acre plant area. Ductwork visible is part of abandoned steam heating system.

At the Richards-Wilcox plant, Dravo heaters serve dual heating jobs—heating both the local area and, through duct take-offs, serve adjacent areas. ▼



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For more facts circle 573 on Reply Card

NEW PLANT CONSTRUCTION — advance information on location, costs

Los Angeles, Calif.—Koppers Co., Inc., and Brea Chemicals, Inc., a subsidiary of Union Oil Co. of California, will construct and operate jointly, a new polyethylene plant with an ultimate capacity of 60 million lb annually. Construction of the new plant in L.A. County will begin at once and will be in operation by mid-1957. Cost estimated at $10 million.

Rosemead, Calif. — Mercury Division, Ford Motor Co., has plans under consideration for the construction of a new assembly plant at Rosemead, near Los Angeles. Plant will be equipped with a working area of 1.4 million sq ft and main building will comprise an area of 32 acres, all under one roof. Plant to cost about $40 million will be completed in April 1957.

Torrington, Conn.—Haydon Manufacturing Co., 900 Brightwood Ave., Torrington, Conn., (Division of General Time Corp.) has authorized plans for erection of new plant expansion at local plant. Work is expected to get under way at once for completion in the spring of 1957. Cost of expansion reported to be $1 million.

Chicago, Ill.—The International Harvester Co., 180 N. Michigan Ave., manufacturers of steel bars, beams, billets, shapes, and pig iron, will begin modernization and expansion program at company's Wisconsin Steel Works, here. Cost of expansion and improvement program will approximate $10 million.

Baton Rouge, La.—The W. R. Grace & Co., 7 Hanover Square, New York, N. Y., is constructing a new semi-works plant, estimated to cost $1 million, for the production of polyethylene and other polymers. A large plant for the commercial production of polyethylene is also planned and will be on stream by mid-1957. New installation will be located on a 150-acre site, six miles north of here. Cost of overall project will exceed $18 million.

Detroit, Mich.—Chevrolet division of General Motors Corp., 3044 West Grand Blvd., has announced plans for construction of company's largest auto-truck assembly plant. It will be located on a 300-acre tract of land in Lordstown township, Trumbull County, approximately 12 miles northeast of Youngstown, O. New plant will have a total area of 2.5 million sq ft and will be placed in operation by fall of 1957. No estimate of cost announced but expected to be a multi-million dollar project.

Plymouth, Mich. — The Burroughs Corp., 6071 2nd Blvd., Detroit, Mich., has announced plans for major expansion and improvement program and will begin construction of a new 204,000 sq ft addition to its Plymouth Division here. New one story structure will increase floor area to 840,000 sq ft.

Wyandotte, Mich. — The Wyandotte Chemicals Corp., Alkali Square, has announced a major expansion program of its cement plant facilities. Modernization of the plant and expanded facilities will cost an estimated $2 million. In addition, air pollution control equipment consisting of electric precipitators to eliminate dust emissions from the cement plant will cost $500,000.

Meridian, Miss.—The Kroehler Manufacturing Co., Naperville, Ill., is constructing a new lumber processing plant. Gum wood, for the manufacture of sofa and chair frames and poplar wood, for the manufacture of bedroom furniture will be processed at new plant. Cost reported to be $3 million.

Pascagoula, Miss.—The Coastal Chemical Corp., a newly formed company, has plans under consideration for the construction of a chemical plant for the manufacture of high analysis nitrogen fertilizer. Construction of buildings and placing of equipment will begin when deep-water harbor facilities at the port are completed.

Louisiana, Mo.—The Hercules Powder Co., Inc., 917 Market St., Wilmington, Del., has authorized plans for the construction of new plant for the production of 7 million gal of methanol annually. Product, used to make antifreeze, solvent, plastics, drugs and dyes, is also used in the manufacture of formaldehyde, which is a raw material for pentaerythritol. Plant when completed will represent a $2 million investment.

Dover, N. J.—The Westinghouse Electric Corp., Pittsburgh, Pa., has authorized plans for the construction of a new plant for the manufacture of moving stairways and escalators. The one-story steel and concrete structure is expected to be completed and in operation by 1957. No cost announced but expected to be a multi-million dollar plant. Skidmore, Owings & Merrill, New York, N. Y. are the architects.

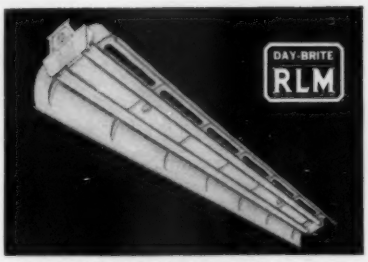
Newburgh, N. Y.—The E. I. du Pont de Nemours & Co., Inc., (Fabrics Division) has approved plans for the modernization and expansion of manufacturing facilities at company's coated fabrics plant here. Work on two story masonry building, to house a new calender and related equipment, will begin at once. A two story masonry addition is planned for relocating the vinyl solution manufacturing unit and pigment dispersing facilities. Cost of expansion will be $3 million.

Rochester, N. Y.—The Eastman Kodak Co., 343 State Street, has announced an expansion and capital improve-

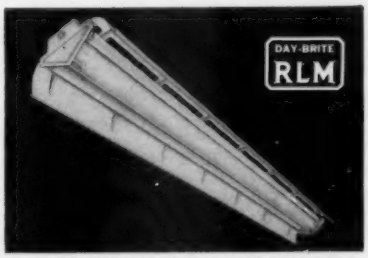
(Continued on page 202)

"What do you think this is—a hobby shop?"

Lighting by DECIDEDLY BETTER DAY-BRITE Lighting Fixtures makes the big difference



Day-Brite CFI-10, with 10% upward lighting component



Day-Brite CFI-25, with 25% upward lighting component

Typical Day-Brite CFI (Comfort For Industry) installation

Doing the job right

is so dependent on lighting it right. And good lighting makes the big difference in seeing and doing—relieves eye strain and fatigue, helps meet close tolerances, reduces spoilage, improves worker safety and morale. That's why industry is rapidly adopting new Day-Brite CFI (*Comfort For Industry*) fixtures with slotted reflector units which throw the light upward as well as down on the work . . . Before you decide on any phase of lighting, consult your Day-Brite representative. You'll find him in your classified phone directory. Or, send for special CFI industry-lighting literature.

Extra light —no extra cost

By introducing slotted openings in the reflector tops of Day-Brite CFI (Comfort For Industry) fixtures, a portion of the light is directed upwards. This provides two advantages: (1) Longer periods of maintained illumination are assured because natural updraft ventilation keeps reflectors cleaner. This means extra light at no extra cost. (2) Harsh ceiling contrasts are washed out; eye fatigue and discomfort are reduced. Result: greater work accuracy, greater safety, less spoilage, improved production.

Nation's largest manufacturer of commercial and industrial lighting equipment

DECIDEDLY BETTER DAY-BRITE Lighting Fixtures

61140

Day-Brite Lighting, Inc., 5439 Bulwer Ave., St. Louis 7, Mo.

For more facts circle 574 on Reply Card

NEW PRODUCTS AND PROCESSES summarized for your convenience

Edited by M. E. Heniken

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 207-208.

1—DOCK RAMP is easily installed, low cost unit

Dock-O-Matic offers small plants a powered dock ramp that is low in cost and readily installed. In one compact unit it combines an adjustable steel dock ramp and power activating mechanism. It is operated by means of an up-down lever switch. No piping, special wiring or pit construction is required to install the Dock-O-Matic, it is pointed out; no recess must be dug for the cylinder base and no special concrete enclosure is required for the power unit. It can be installed anywhere, says company, and the base of the cylinder is mounted on the bottom of the pit with the entire mechanism above ground.

The power cylinder is a single-action piston type hydraulic assembly. The power unit consists of a self-contained motor pump and activating mechanism located on the underside of the platform to allow for ease of maintenance. An integral built tank requires a maximum of 5 gal of oil for operation. The platform is made of structural steel. Available in three platform sizes, the Dock-O-Matic has roll-over capacities of 10,000 or 20,000 lb. The Wayne Pump Co.

3—VIBRATION ISOLATOR for the big machines

Developed for direct mounting of heaviest machinery without special chassis or foundations is the SK/50,000 Vibro-Isolator rated at 75,000 lb for steady-running applications and 50,000 lb for impact applications. Manufacturer states that direct mounting of presses and other machines weighing up to 300,000 lb is feasible and economical with only four of the new SK/50,000 Vibro-Isolators — and without heavy foundations.

These isolators consist of heavy-duty welded all-steel housings containing high carbon or chrome-vanadium helical steel springs as the isolation medium. Upper and lower members of housing are held in their relative position against lateral movement by resilient chocks which take up any horizontal thrust, it is noted, and which can be adjusted for varying degrees of damping to limit vertical and horizontal oscillation under both vibration and impact. Two bolts in the housing secure mounting to machine and provide for leveling. The Korfund Co., Inc.

2—HYBRID MOTOR offers constant speed, rugged construction

Basically new, the Synduction Motor is a synchronous motor built on standard induction motor frames and enclosures and using a simple die-cast rotor. It requires no brushes, slip rings or windings on the rotor, no separate source of d-c excitation, no special starting equipment. It is reported to offer advantages over existing types of synchronous reluctance motors, and approach efficiency and power factor of squirrel-cage units. It starts as an induction motor with a high locked-rotor torque, accelerates and pulls into synchronism quickly; then runs as a synchronous motor. Having a high (175 to 200 per cent) pull-out torque, motor is said to remain in synchronism regardless of load or line variations.

As explained by manufacturer, this motor is designed to operate over a wide frequency and, therefore, a wide speed range. Frequencies of 300 cycles and speed above 10,000 rpm are available. Motors for frequencies as low as 10 cycles have been developed. According to company engineers, the Synduction Motor is "looking for jobs to do" in industry. Early units were built for a process in the production of synthetic fibre where many motors must remain synchronized over a wide speed range.

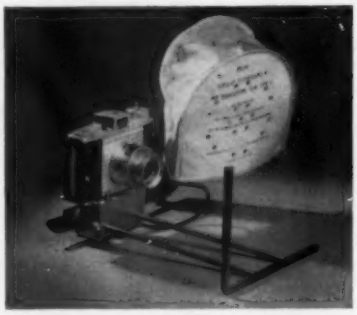
It is expected that availability of a durable, easy to maintain, long life synchronous motor built on the same or slightly larger frame used for a standard induction unit will open new possibilities where automated equipment must be synchronized. These motors need only standard across-the-line starting equipment, except in the largest ratings, where reduced voltage starters are required. Synduction Motors are built from fractional up to 40 hp. Their cost is reportedly higher than an induction motor, much lower than a synchronous machine. At present each Synduction Motor is being engineered for the individual application. Allis-Chalmers Mfg. Co.

4—ROOF VENTILATOR offers efficiency, low upkeep

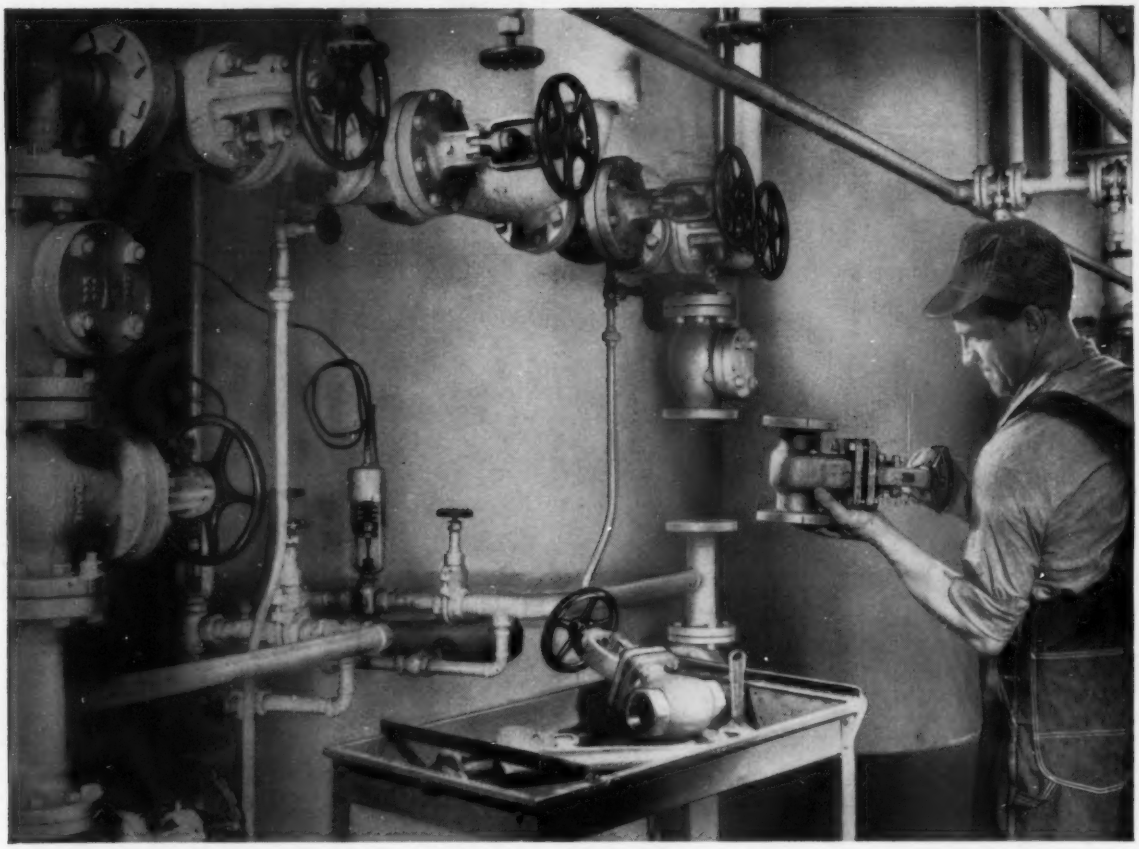
Special features make the Type LSQ Power Roof Ventilator particularly desirable for use on industrial and other public buildings, according to manufacturer. It is available in five sizes with low speed and high speed models. The unit is designed to require almost no maintenance. Contributing to its economy are unit construction (ventilator is shipped assembled and enclosed in its aluminum housing that needs no painting); vertical type Q propeller fan is permanent split-capacitor type motor, direct-connected; electrical connections in mounting saddle on the outside of the housing; motor with double sealed permanently lubricated ball bearings. In addition, the unit has a low silhouette. Shutters of gravity and motor-operated types with interconnected blades to eliminate back draft are available accessories. They are mounted in the base of the unit where they are readily accessible. Ilg Electric Ventilating Co.

5—CLOSE-UP OUTFIT for industrial photography

Intended principally for usage with the new Kodachrome Type F and Ektachrome Type F films, this kit includes a Kodak Pony 828 Camera, Kodak B-C Flashholder, bracket and field frame for establishing the location and area to be photographed, Kodak Flashguards A and



B, Series V Kodak Adapter Ring, and Series V Kodak Portra Lens 5. The field frame outlines an area approximately 3⅛ by 4½ in. at 7 in. from camera lens. This area is in focus and fills the negative. Pictures are made by placing the field frame against or around the subject and shooting. It is not necessary to compose



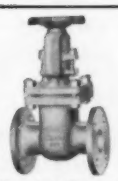
Corrosion meets match in Crane 18-8 SMo and Craneloy 20 valves

It's unanimous! These Crane valves for the process industries were *especially designed* of Crane alloys to cope with costly corrosion and to cut replacement costs.

The gate valves feature a simple, split-wedge disc construction which permits discs to rotate freely within guides and to seat tightly at all points on the seat perimeter. The free movement of the disc, plus uniform seating and unseating loads, minimizes galling and seizing, reduces wear and allows smooth operation under all conditions.

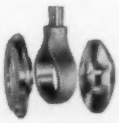
Globe and angle valves now feature a modified plug-type disc that combines the advantages of the easier seating of the narrow ball-to-flat seat and the high resistance of the wider plug-type disc to corrosion, erosion and cutting. In addition, these valves offer a new swivel disc-stem connection that seats the disc squarely every time. Minimum clearance eliminates vibration.

These valves are available in 18-8 SMo and Craneloy 20 . . . in gate, globe, angle and check patterns . . . ½" to 6" . . . screwed or flanged ends. Rated 150 p.s.i. at 500° F.—230 p.s.i. at 100° F. *For more detailed information*, confer with your CRANE representative or write to the address below for the 12-page circular AD-2080.



Split-wedge disc gate.

Swivel disc globe.



Crane trunnion-mounted split-wedge disc combines the benefits of free rotation with uniform seat load pressure.

New swivel disc stem connection in globe and angle valves permits the disc to swivel freely on contact with seating surfaces.

CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

For more facts circle 575 on Reply Card

When is adequate wiring

...really adequate?

Heavier wiring is not the *complete* answer to adequate wiring. You must be able to *use* the wire to its full, safe current carrying capacity. That means you should not have to *derate* your circuits.

Derating simply subtracts from your usable electrical capacity. It's a means of allowing for changes in performance of many circuit protectors when they're warm. But, the rating of HEINEMANN CIRCUIT BREAKERS never changes.

Hot or cold, Summer or Winter, you enjoy the full safe use of your wiring system. Derating—under any conditions—is eliminated.

When you specify HEINEMANN CIRCUIT BREAKERS, you make sure that "adequate" wiring will always be *really* adequate . . . and safe.

Send for your copy of Manual 101, "What you should know about circuit breakers."

HEINEMANN
ELECTRIC COMPANY
128 Plum Street, Trenton 2, N. J.
Circuit breakers

For more facts circle 576 on Reply Card

NEW PRODUCTS

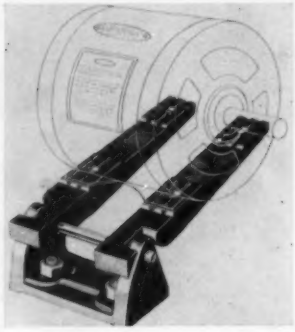
(Begins on page 136)

and focus each picture individually.

Normal shots from 2½ ft. to infinity can also be made with the camera, and without the bracket or field frame since in normal picture taking they will not interfere with the lens. Thus, you may make a full-length shot of the subject, followed in sequence by a medium close-up picture, and a detailed enlarged close-up. Use of the 828 film in this outfit permits photographers to process exposed film after eight exposures rather than having to wait until a complete roll of 20 or 36 exposure 135-film is used. The Flashguard supplied with this outfit is designed for close-up work and reduces light emanating from flashlamps and minimizes heat shock. The close-up outfit is priced around $63.00. Eastman Kodak Co.

6—MOTOR BASE, for V-belt drives, holds tension

Described as inexpensive and requiring no maintenance the Auto-Tension Motor Base is designed to automatically compensate for belt stress and maintain exact belt tension for all load conditions. The



greater the load the greater the belt tension, says manufacturer, and this substantially reduces wear on both belts and bearings. Operation is quiet with this base, it is reported, and belts can be changed without disturbing the mounting. The base comes in four NEMA motor frame sizes from 1/6 to 7½ hp. It is designed for use with horizontally positioned drives—is not for use on wall or ceiling mountings. Bulletin 1300 gives details. Lovejoy Flexible Coupling Co.

7—HAND CLEANER is economical and handy to use

Handyman's Clean-Up may be used by office or shop personnel for removing grease, paint, oil, printer's inks and tar. However—of interest wherever women employees are concerned—the cleaner is claimed not to affect fingernail polish. The cleaner is used without water, simply rubbed on the hands and wiped off. It liquefies almost immediately and flows freely into the small skin creases and around fingernails. Although it quickly

Two completely *NEW* gas tractors ...by MERCURY

The MERCURY "Huskie" and "Super-Huskie" were designed for rugged service—built to move mountains of material for long, continuous hours. Working either inside or outside, on level ground or on steep grades, in any type of weather, these new models will move your tonnage, regardless of size, shape or weight, for less. Utilize the power of these new models for your material handling operations.

MERCURY *Huskie*

MODELS 930 and 940 GAS TRACTORS

4 Wheels—DBP of 3,000 and 4,000 lbs., respectively

AVAILABLE IN LPG OR REGULAR GASOLINE MODELS

- ★ Six cylinder industrial engine—heavy duty clutch—fluid coupling and synchromesh transmission with provision for power take-off.
- ★ Full spring suspension—standard with all MERCURY tractors.
- ★ Smooth, functional body . . . frame, bumpers and fenders welded to form integral unit.
- ★ Unusual accessibility to all component parts.
- ★ Tops in operator comfort.

OPTIONAL EQUIPMENT:

1. L.P. Gas fuel system.
2. Torque converter and planetary transmission providing two speeds forward and one reverse, eliminating clutch pedal.

MERCURY *"Super Huskie"*

MODEL 950 – Gas Tractor

Specifically designed for extra-heavy duty, the MERCURY "Super-Huskie" is a 6-wheel model developing a D.B.P. of 5,000 lbs. It incorporates the same features designed into the new "Huskie."

LOOK FOR US . . . BOOTH 1003

Materials Handling Institute's Convention
Cleveland, Ohio • June 5 through June 8

MERCURY

FORK TRUCKS · TRACTORS · TRAILERS

MAIL COUPON TODAY

MERCURY MANUFACTURING COMPANY
4002 South Halsted Street, Chicago 9, Illinois

Send me the following Mercury Bulletins:

- ☐ T-103 – Model 930, "Huskie" Gas Tractor
- ☐ T-104 – Model 940, "Huskie" Gas Tractor
- ☐ T-105 – Model 950, "Super-Huskie" Gas Tractor

NAME_____

ADDRESS_____

CITY_____ ZONE___ STATE_____

ATT'N_____

For more facts circle 577 on Reply Card

THE ELLIOTT ELECTRICAL CONTROL

Get tight, uniform tube joints everytime and get them fast. The Elliott Electric Control, a torque-limiting device designed for use with any standard tapping motor, automatically balances outside voltage variables (without the need of a separate voltage regulator), controls the torque, and tells you when the tube has been rolled tight.

Speed the operation too with balancer and the Elliott Stabilizer which takes the wobble out of tube rolling. It centers and holds the expander case and cage, allowing operator to keep both hands on the motor. Full details in Bulletin Y-40. Address Elliott Company, Lagonda Division, Springfield, Ohio.

ELLIOTT Company

Y5-6

STEAM TURBINES • MOTORS • GENERATORS • DEAERATING HEATERS • EJECTORS • CONDENSERS • CENTRIFUGAL COMPRESSORS • TURBOCHARGERS • TUBE CLEANERS • STRAINERS

For more facts circle 578 on Reply Card

NEW PRODUCTS

(Begins on page 136)

removes stains, Handyman's Clean-Up is said to contain no harsh grit cleaners, and it contains lanolin as a skin protective ingredient. With each gallon of cleaner (costs around $5.00) a free pump dispenser (capacity 8 oz.) is furnished. The container is designed for wall mounting; the pump feature prevents waste, messiness. My-Ko Chemical Corp.

8—BUILDING PANEL is long lasting, good looking

Development of a glass fiber reinforced plastic building panel which will last up to six times longer than many plastic panels is announced in Granitized Corrulux. Tests of this material are reported to show superior erosion resistance. Most

apparent feature of the product, however, is its new look. The "granitizing" process produces a surface evenly sparkled with minute facets of tough polyester which protects the glass fiber reinforcements more thoroughly. This process is not a coating or glazing one, explains company, but rather one which molecularly bonds tough polyester resins over the glass fibers and throughout the panel. The jeweled surface provides an additional advantage in creating a turbulent cleansing action from rain or hosing—there are no sharp ridges to impede cleaning or catch dirt. Corrulux Div., L-O-F Glass Fibers Co.

To receive product data circle item numbers on the handy Reader Service Cards provided on pages 207-208.

9—BATTERY CHARGERS are compact and portable

Included in this line of industrial battery chargers are 20-amp types for 24-v and 36-v lead acid batteries and 60-amp type for 12-v lead acid or 10-cell nickel alkaline batteries. The chargers are compact, portable, and may be plugged into a 115-v electrical outlet. They are designed for continuous every night service. After the operator sets the time switch, provided as standard equipment, the charger automatically shuts down the starting rate to

For more facts circle 579 on Reply Card →

Perspective illustration shows travel of conveyor system through bench area where principal meter repair and re-assembly occurs. Other conveyors carry meters through stripping, cleaning, tinning, painting, oiling, testing and to storage or shipping.

WEBB

Conveyors Pacing Production

A Webb overhead trolley conveyor system was designed to provide straight line production flow through all the many operations required in this gas meter repair plant. This straight line flow system resulted in lower production costs . . . reduced manual handling . . . set the pace for production . . . increased efficiency . . . was a contributing factor in improving work quality. Prior to the installation of the conveyor system, there were 25 manual handlings of a gas meter . . . covering 937 feet of movement. Now, there are only two manual handlings of each meter . . . covering 100 feet of movement. These two manual operations occur in Receiving and Final Storage Area.

This Webb conveyor system also provides overhead storage area for meters in process. A backlog of production constantly flows on the conveyor line. The conveyor brings the meters down to a 34″ height when they enter the work bench area. On leaving the area, the conveyors rise again to a 7′ clearance level . . . leaving all aisles open at all times. By providing this live storage area overhead, the conveyor system completely frees floor space for production operations.

This installation is a typical example of how Webb conveyor systems are increasing plant efficiency and lowering production costs in many industries. Webb engineers can also help you achieve these goals . . . regardless of your materials handling needs.

See our Exhibit at Booth 110, Material Handling Institute Show • Cleveland, June 5 to 8

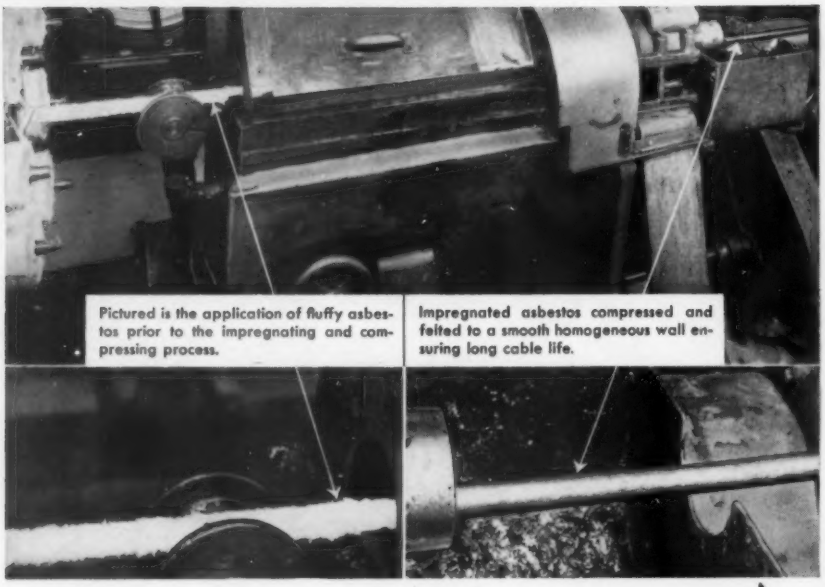
JERVIS B. WEBB CO.

Specialists in Custom Conveyor Systems

8933 ALPINE AVENUE • DETROIT 4, MICHIGAN

FACTORIES: DETROIT • ATLANTA • LOS ANGELES • HAMILTON, ONTARIO, CANADA • ENGLAND • FRANCE • AUSTRALIA

seamless FELTED ASBESTOS walls add up to long range economical service



Pictured is the application of fluffy asbestos prior to the impregnating and compressing process.

Impregnated asbestos compressed and felted to a smooth homogeneous wall ensuring long cable life.

look beneath the braid

. . . that's where quality begins

Long lasting, trouble-free circuit performance depends on the materials and construction of wire and cables. And a look under the braid shows why Rockbestos A.V.C. (N.E.C. Type AVA) is built to give longer service.

The two seamless, dense felted asbestos walls, compressed and thoroughly impregnated with selected compounds, seal the varnished cambric from heat and moisture.

Dielectric strength stays high under high ambient temperatures. Heat dissipation is uniform. The felted wall construction protects the varnished cambric from rupture in the sharpest bends.

HERE'S HOW YOU BENEFIT*

Get high dielectric values from Varnished Cambric because of its controlled application over seamless felted asbestos walls.

HIGH DIELECTRIC STRENGTH — minimum breakdown voltages for 600 and 1000 volt power cables — 15 KV.

MOISTURE RESISTANCE — same minimum dielectric breakdown — wet or dry — 15 KV on 600 and 1000 volt power cables.

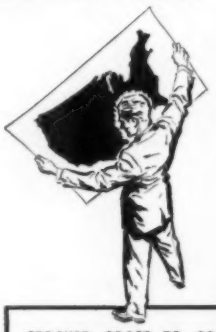
RUGGED CONSTRUCTION — minimum breakdowns after bending tests — 15 KV for 600 and 1000 volt power cables all sizes.

CONTROLLED QUALITY — materials and workmanship and performance under rigid Quality Control.

CUTS MAINTENANCE COSTS — It won't bake brittle, crack or flow in high ambients . . . won't deteriorate with age, or rot when exposed to oil, grease or fumes.

The result: wire failures are eliminated; maintenance costs are held down; plant and equipment operation maintained at top level.

*Write for the test and construction specifications of Rockbestos A.V.C. (N.E.C. Type AVA) available in the new booklet, "Specification RSS-88."



STOCKED COAST TO COAST
Standard Rockbestos A.V.C. construction (N.E.C. types AVA, AVB, etc.) are available for immediate shipment. Call or write nearest branch office.

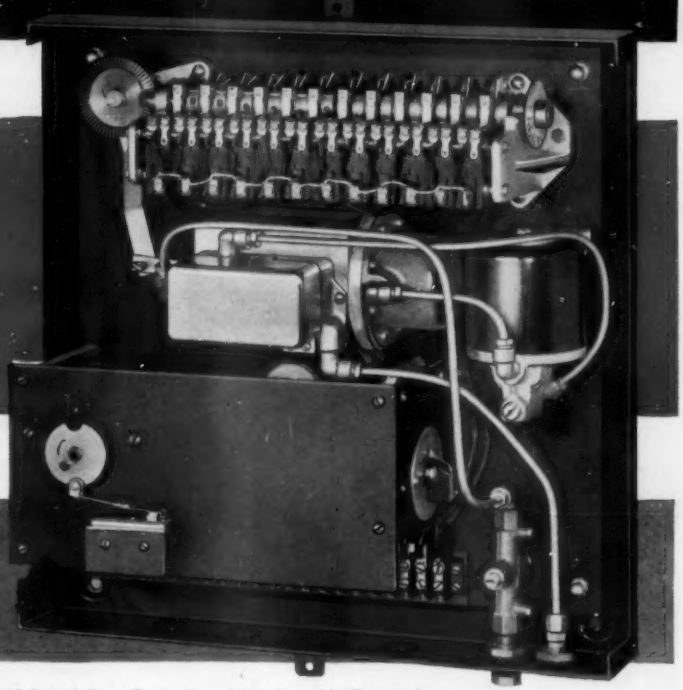
ROCKBESTOS PRODUCTS CORP.
NEW HAVEN 4, CONNECTICUT

NEW YORK CLEVELAND • DETROIT • CHICAGO • PITTSBURGH • ST. LOUIS • LOS ANGELES • NEW ORLEANS
OAKLAND, CALIFORNIA

For more facts circle 580 on Reply Card

REFRIGERATION CAPACITY CONTROL

JOHNSON Pneumatic Step Controller



- BALANCES CAPACITY WITH LOAD
- PREVENTS SHORT CYCLING
- EQUALIZES WEAR OF EQUIPMENT

12 Switch Step Controller with Adjustable Time Delay, Recycler Solenoid and Automatic Sequence Changer.

What It Does

This new and improved controller is designed to accomplish, with a single compact unit, everything that is desired for the control of multiple step refrigeration installations, including "on" and "off" operation of the steps in sequence, positive prevention of the starting of more than one compressor at a time after night shutdown or after current failure, and manual or automatic changing of compressor operating sequence to equalize wear. It can be used to control one or a group of refrigeration machines. It completely eliminates all the disadvantages of a series of separate pressure switches.

How It Works

The Johnson Pneumatic Step Controller, in response to changes in pressure from a controlling thermostat, actuates a number of separately adjustable, snap-acting, single-pole, double-throw switches in any desired sequence. Control arrangements include (1) starting and stopping two or more compressors in sequence, (2) operation of cylinder unloaders in sequence, or (3) a combination of (1) and (2).

Special Features

Recycler and Time Delay—Recycler Solenoid immediately returns all switches to their normal position on shutdown or current failure. Time Delay assures the proper interval between successive switch operations on start-up or when current is restored after failure.

Sequence Changer—Varies the starting sequence of compressors to equalize running time and wear. Step Controllers are furnished with either Manual or Automatic Sequence Changer.

Models—Choice of 4, 6, 8 and 12 switch units, with or without special features such as Recycler, Adjustable Time Delay and Sequence Changer.

* * *

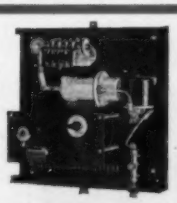
Installation and operation of the Johnson Pneumatic Step Controller is both simple and inexpensive. A nearby Johnson engineer will gladly explain, without obligation, how it can best solve your special problems, or write today for full details.

JOHNSON CONTROL
SINCE 1885

PLANNING • MANUFACTURING • INSTALLING

OTHER APPLICATIONS

Johnson Step Controllers are also used to control multiple fan or pump installations, electric heaters and other systems where electrically actuated devices are to be operated in sequence from a proportional acting pneumatic controller. Send the coupon for more facts.



JOHNSON SERVICE COMPANY
507-R East Michigan St., Milwaukee 1, Wis.

Please send me Apparatus Bulletin G-180 describing specifications, features and application of Johnson Pneumatic Step Controllers.

NAME_____

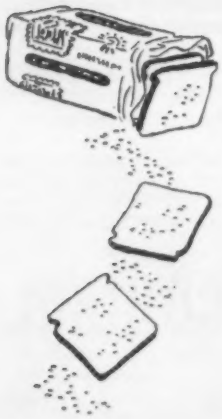
FIRM_____

ADDRESS_____

CITY & STATE_____

For more facts circle 581 on Reply Card

BAKING PLANT RECEIVES 29 YEARS OF TROUBLE-FREE GAUGING



Reliability is a *must* in industrial gauging. That is one reason why Liquidometer quality gauges are specified in a wide range of industries where liquids are stored and measured.

The Liquidometer gauge installation at General Baking Company's Brooklyn plant is typical. It takes close to 7000 gallons of fuel oil per week to run the baking ovens, generate steam and heat the plant. Here, the important job of fuel gauging has been successfully performed by the same Liquidometer Senior gauge uninterruptedly for 29 years.

Dependability, low-maintenance, high readability, safety and ease of installation suit Liquidometers for your liquid gauging needs.

A variety of dial type Liquidometer gauges are available for direct and remote indication. For complete details write Dept. **D** for Bulletin 468.

LIQUIDOMETER INSTRUMENTS

Liquids worth storing are worth measuring

THE LIQUIDOMETER CORP.

SKILLMAN AVENUE AT 36TH STREET, LONG ISLAND CITY 1, N. Y.

For more facts circle 582 on Reply Card

NEW PRODUCTS

(Begins on page 136)

a proper finishing rate and automatically shuts off the finishing rate after 4 hrs. For nickel alkaline batteries, which do not require a finishing rate, the time switch shuts off according to its setting. These chargers, according to the manufacturer, are lower priced than any similarly rated chargers on the market. Bulletin 356C gives further information. Baldor Electric Co.

10—SPRAY COATING covers markings on cartons

Hide-a-Mark is a spray Kraft paper color coating for covering old stencil marks, crayon, ink or pencil markings. It comes in a giant—16.2 oz—aerosol can, and is designed to make cartons, crates, drums and other containers re-usable. Besides making otherwise wasted containers available for re-use, this coating is reported fast drying so that new stenciling can be done almost immediately. Krylon, Inc.

11—LUBRICATOR UNIT creates fine, uniform oil fog

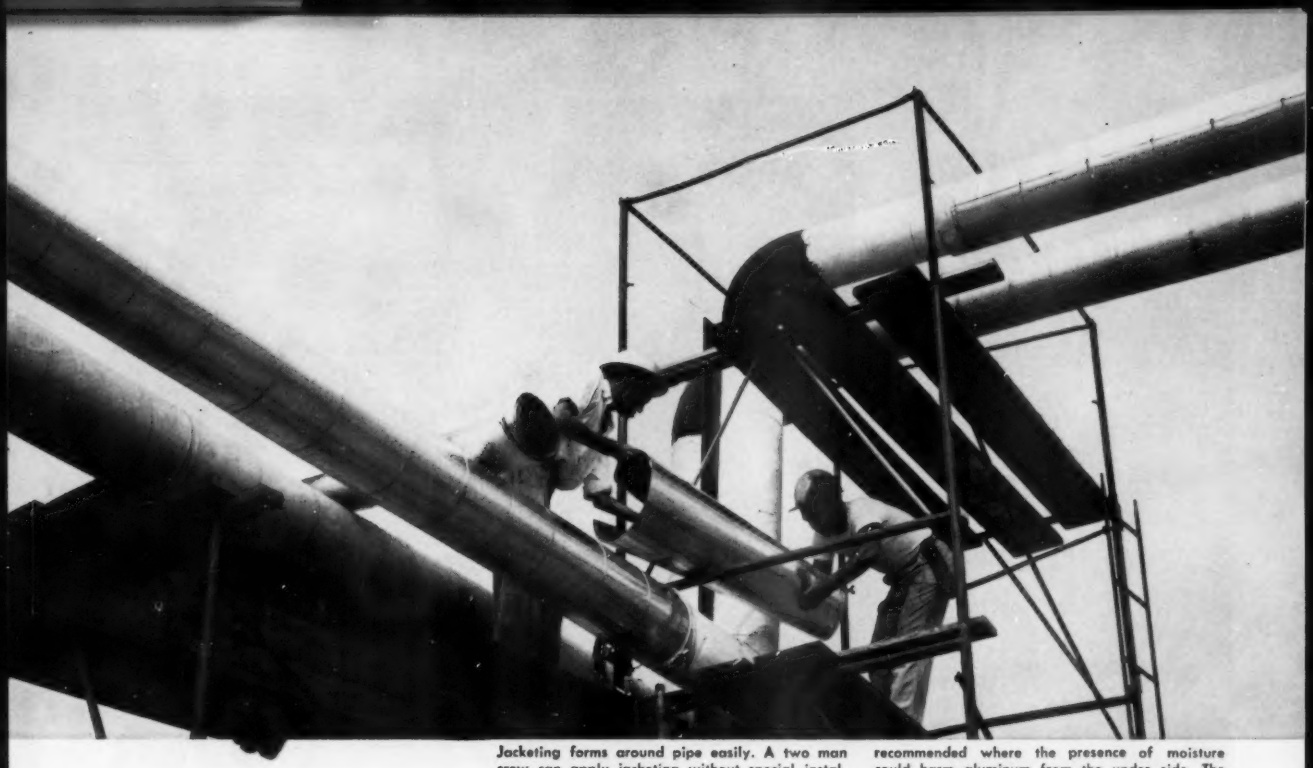
The Micro-Fog Lubro-Control Unit is designed to automatically create a finely divided air-borne oil fog which can be uniformly distributed through complex piping systems to multiple lubrication points. According to reports, a single unit can completely lubricate even the largest machines—up to 1000 bearing-inches. Two pressure switches and a float-controlled switch are provided for connection to a control panel, if desired, to actuate an automatic alarm system or controls when air pressure fails, when excessive pressure develops in oil reservoir, or when oil needs replenishing.

The unit is described as small, compact and complete, measuring 12-by-11-by-9 in. It contains necessary controls plus a 2-gal oil reservoir—enough oil for 12-hr lubrication at maximum output. An automatic drain filter is provided to protect unit, lubricant and bearings by removing abrasive and corrosive air line contaminants, and drain the collected liquids automatically. Air pressure is accurately regulated, and a solenoid valve coordinates operation of lubricator with starting and stopping of machine. C. A. Norgren Co.

12—WEATHERSEAL for industrial plant windows, doors

Plastic-backed, woven wool pile weatherseal is introduced for windows of manufacturing and processing plants where it is important to exclude or retain heat, cold, moisture, fumes or dust. This wool-plastic strip is also suggested for installation of window air conditioners, and as a dust barrier between sliding glass panels on instrument cases. As for direct application to products, the pile-plastic seal can be channeled in, or cemented directly to glass, metal, plastic, wood or any other material, it is noted, to form a

For more facts circle 583 on Reply Card →



Jacketing forms around pipe easily. A two man crew can apply jacketing without special installation equipment. Aluminum strapping and seals make application simple and quick, reducing labor costs. Factory-attached moisture barrier is recommended where the presence of moisture could harm aluminum from the under side. The resin type adhesive used exclusively by Childers to bond moisture barrier to under side of jacketing withstands temperatures up to 300°F.

1,286 Plants in 48 States and 14 Foreign Countries

Insure Insulation Efficiency with Childers Jacketing

Leading engineers world-wide specify Childers Jacketing for protecting costly insulation on lines, towers, vessels and tanks. These efficiency minded engineers prefer Childers Jacketing because of these exclusive features:

1. LAP-SEAL (patents pending) insures a more positive weather-seal.
2. Heavy weight jacketing designed for lines subject to abuse.
3. Deep Corrugated Jacketing with factory-attached moisture barrier for towers, vessels and tanks.
4. New resin adhesive that makes a stronger bond between the jacketing and the vapor barrier.

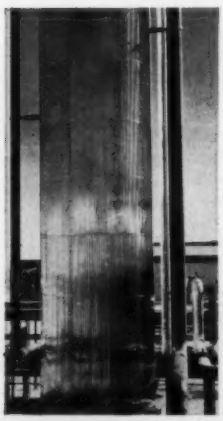
Childers Aluminum Jacketing provides strong, durable protection with three way savings:

1. Lower first cost than any other permanent jacketing.
2. Lower application cost because it's so easy to cut-to-size and attach.
3. Eliminates maintenance because it is made of durable aluminum for maximum corrosion resistance and requires no painting.

Economy minded engineers know that plant efficiency is improved when costly insulation is protected with Childers Aluminum Jacketing. And too, the gleaming beauty of Childers Jacketing makes plants brighter, neater — reduces "housekeeping" costs.

Send for Free Sample and Prices

You can help increase the efficiency of your insulated lines, towers, vessels and tanks by using Childers Jacketing. Write today for free sample and engineering data. **Childers Manufacturing Co., Dept. PLE-8, Houston 8, Texas.**

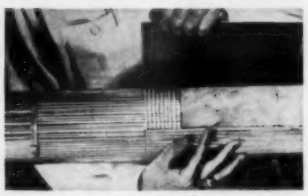


New Deep Corrugated Jacketing For Towers, Vessels and Tanks

Only Childers offers deep corrugated aluminum jacketing with factory-attached moisture barrier. Available in 1¼" and 2½" corrugations. Childers Deep Corrugated Jacketing is used to provide permanent protection for insulated towers, vessels and tanks.

Heavy Weight Jacketing

Only Childers offers .019" Jacketing in labor saving 4' wide rolls. This exclusive product is recommended to protect insulated lines along walkways and in other areas where they are subject to abuse; also recommended for protection of all insulated towers, vessels and tanks.



Lap-Seal

Childers exclusive LAP-SEAL is a series of eight ribs rolled into the underlapping edge of the jacketing.

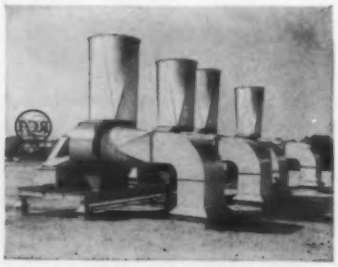
Lap-Seal has 2 important advantages:

1. Where desired, a positive weather seal is easily made with Lap-Seal and a mastic.
2. Lap-Seal provides an automatic measure of the 2" circumferential lap. It saves labor, insures proper lap and prevents waste.

how to PICK UP 2,900,000 BTU without "wiggling" the flame

..solved by a KIRK AND BLUM ventilation system!

Above—Battery of RCA Sealex machines. Heat from glass sealing and evacuating operations on electron tubes is collected by aluminum hoods and duct-work.



One of a number of batteries of roof-top fans which exhaust vented air from 10 identical systems.

Heat can be a headache in any plant. Here, in a midwestern tube plant of RCA Victor Division, Radio Corporation of America, glass sealing and forming operations require plenty of heat of all kinds—induced, radiated and reflected. For the comfort and safety of workers, this heat must be removed but without disturbing the play of gas flames on delicate parts.

KIRK & BLUM engineers achieved a fine balance, removing 2,900,000 BTU hourly and without distorting the delicate flames.

Whatever your ventilation problem... heat, dust or fumes... the best, lowest-cost solution involves more than a fan, motor and some lengths of duct. Put it up to experts...The Kirk & Blum Mfg. Co., 3189 Forrer Ave., Cincinnati 9, Ohio.

KIRK & BLUM
VENTILATION SYSTEMS

For more facts circle 584 on Reply Card

NEW PRODUCTS

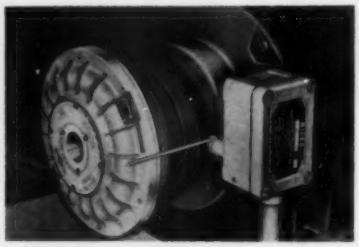
(Begins on page 136)

dustproof smooth-sliding bearing for telescoping, rotating or reciprocating parts. The material is reported to cost as little or less than most weatherseals, and a kit is available for installation on existing wood windows or for maintenance repairs. A catalog and sample are offered. Schlegel Mfg. Co.

13—THERMAL CUTOUT keeps drive from overheating

Protection against overheating of Flexidyne, company's dry fluid drive, is provided by this thermal cutout. Instantaneous mechanical overload protection is inherent in this drive, it is noted; now if an overload causes prolonged slipping and consequent heating of the Flexidyne, the thermal cutout trips the switch, cutting off the power and, if desired, giving an alarm.

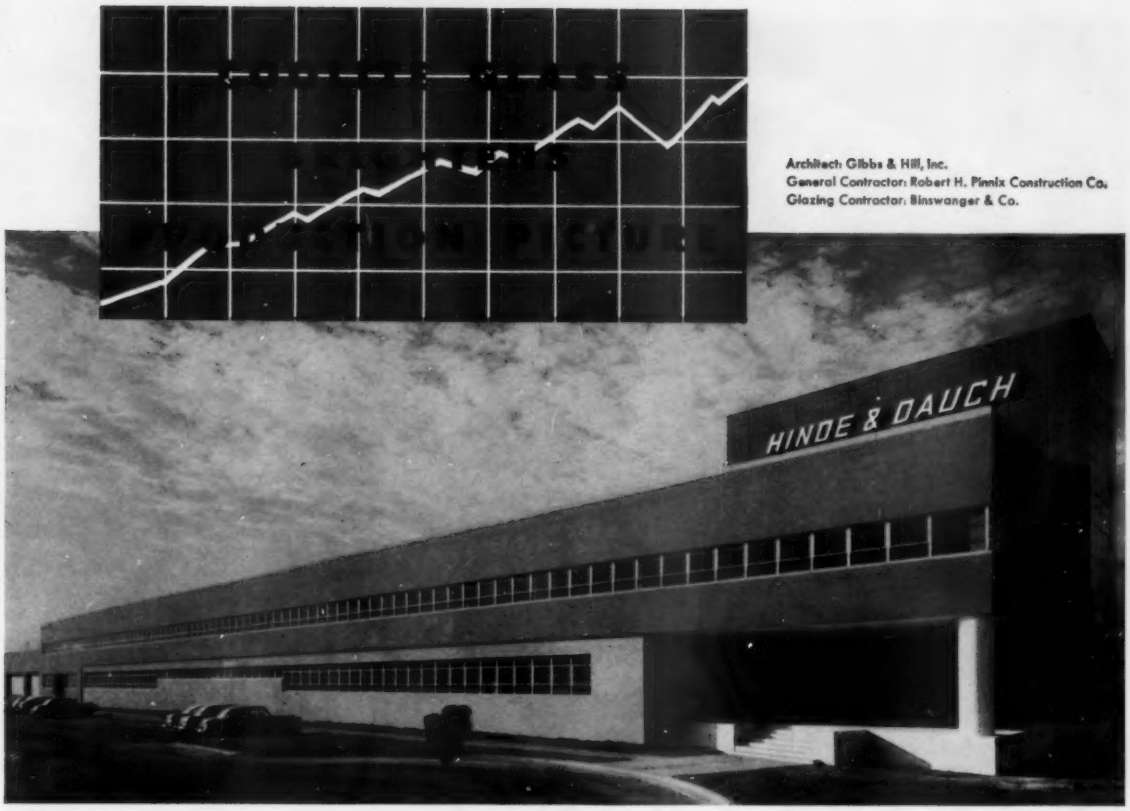
The new thermal cutout is suggested especially for unattended installations. This dependable and economical device is easy to mount on the side of the Flexidyne, says manufacturer. It contains a



trigger spring, held down by an alloy thermal pin. Before the Flexidyne can heat up enough to cause any damage, the thermal pin will melt, allowing the trigger (shown in normal operating position) to spring out so that it will push the non-sparking striker of the special switch to the "off" position. To reset the unit, you simply remove one screw, push back the trigger and insert a new thermal pin, then re-attach to the Flexidyne with the single screw. Dodge Mfg. Corp.

14—MACHINING PROCESS for plastic parts

Using conventional automatic screw machines and other machining equipment, this Cryogenic Process machines many plastics under controlled ultra-low temperature and atmospheric conditions. Types of plastic parts which can be produced using this process include pinions, arbors, axles, toothed wheels, gears, shaped parts, nuts, screws, and compound parts. The process is said to be effective for producing large parts as well as miniature and subminiature pieces. Among advantages reported are improvement in dimensional stability and tolerances obtainable, lowered costs due to reduction in rejects, faster rates of production, more uniform parts, better sur-



Architect: Gibbs & Hill, Inc.
General Contractor: Robert H. Pinnix Construction Co.
Glazing Contractor: Binswanger & Co.

Corrugated Box Plant Achieves Better Daylighting With Heat Absorbing, Glare Reducing Glass

Production efficiency and quality controls benefit from the high levels of natural illumination possible with Coolite. For Coolite, the heat absorbing and glare reducing glass, filters out unwanted elements in "raw sunlight." For example, this modern Hinde & Dauch corrugated box plant, Gastonia, North Carolina, takes full advantage of southern sunshine without distracting, uncomfortable glare and heat. 12000 sq. ft. Coolite, glare reduced both sides for maximum diffusion, is installed in two elevations . . . throws eye-easy daylighting deep into the structure. And since Coolite absorbs up to 50% of unwanted heat rays, the interior remains comfortable while flooded with low cost, natural illumination.

Employees feel better, work better, under Coolite-conditioned daylighting. In your new building or remodeling projects, let light give a lift to production. Specify Coolite by Mississippi . . . the heat absorbing and glare reducing glass that brightens any production picture.

Translucent, light diffusing glass by Mississippi for better daylighting, is available, wired and unwired, in a wide variety of patterns and surface finishes, all scientifically designed to distribute light to best advantage. Available at most leading distributors of quality glass.

Write today for free Coolite catalog.

Address Dept. 13.

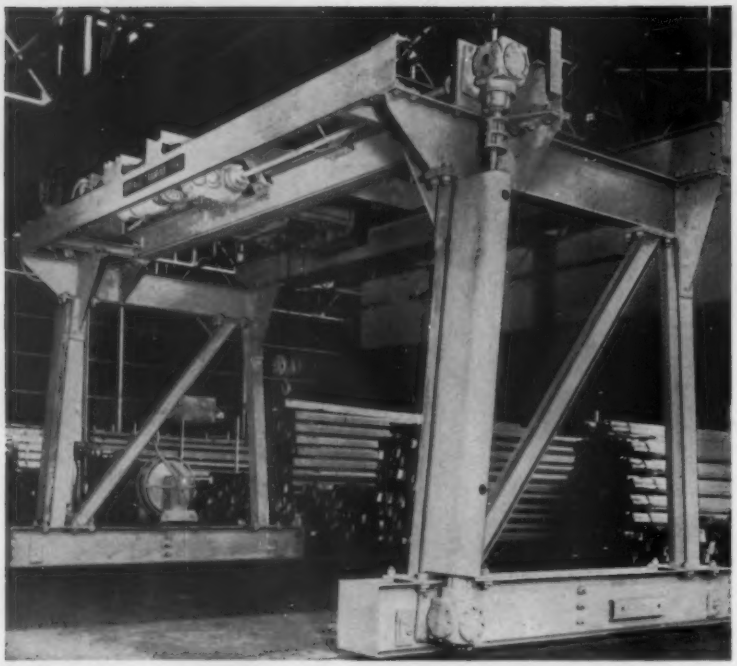
MISSISSIPPI GLASS COMPANY

88 Angelica St. • St. Louis 7, Mo.

NEW YORK • CHICAGO • FULLERTON, CALIFORNIA

WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

For more facts circle 585 on Reply Card



CHICAGO TRAMRAIL

GANTRY CRANES

At the modern plant of one of the country's largest aluminum companies, Chicago Tramrail Gantry Cranes handle long extruded pieces from a 14,000-ton extrusion press . . . transfer these pieces to other operations throughout the mill.

Fourteen Chicago Tramrail Full Gantry Cranes provide individual handling equipment for individual operations to eliminate waste time waiting for busy overhead cranes. Designed for heavy-duty, continuous service, these Gantries are built with maximum headroom and maximum clearance between legs to operate independently under the large overhead cranes.

For a practical, economical solution to your materials handling problems, see our experienced engineers. Special designs, sound engineering and broad application knowledge qualify us for helpful service.

CHICAGO TRAMRAIL CORPORATION

1324 SO. KOSTNER AVENUE • CHICAGO 32, ILLINOIS

OVERHEAD CRANES • JIB CRANES • STACKER CRANES • MONORAIL SYSTEMS

For more facts circle 586 on Reply Card

NEW PRODUCTS

(Begins on page 136)

face finishes, and elimination of some secondary finishing operations. Process is most useful in producing parts from plastics with high coefficient of thermal expansion. Standard Automation Products, Div. General Industries of America.

15—RUST PREVENTIVE to spray on tools and instruments

Rust Chek is packaged in a 12-oz aerosol spray container. According to manufacturer, a can provides about 80 sq ft of coverage in the form of a clear, dry, waxy film to a thickness of 0.0005 in. Except in the case of use on precision instruments where critical tolerances must be held, the film need not be removed when the tool, machine or part is removed from storage and readied for use. The film is worked off in the using, it is explained, and in some applications, it serves as a lubricant. Besides its ease of application, Rust Chek is claimed not to absorb dust and dirt. Eastern Aerosol Products.

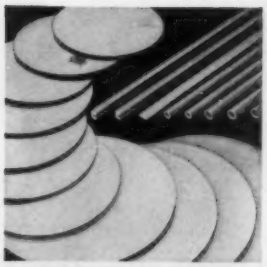
16—PUMP easily converts from single to duplex

Type S Condensate Pumps are close-coupled, bronze-fitted pumps furnished with a 12-gal. cast iron receiver, having a capacity from 2000 to 8000 sq ft EDR

and 3450 rpm. Pumps are easy to convert from single to duplex. Features include low 7½ in. inlet, mechanical seal and dynamically balanced enclosed bronze impeller. No sub-base is required. Pumps are easy to take apart for inspection without removing pipe connections—simply by removing 3 bolts. Bulletin 1460 gives more details. Sarco Co., Inc.

17—VIBRATORY FEEDER handles bulk materials

Hi-Vi Electro-Permanent Magnetic Vibratory Feeders operate directly on available 115-v or 230-v a-c without a rectifier, and have a simple electro-permanent magnetic drive, said to deliver higher vibratory output with lower power input, and eliminate need for bearings and friction-producing parts. Designed for maximum adaptability in such operations as feeding, mixing, drying, cooling, packing, conveying, and spreading, the new units can handle bulk materials from big pieces to fine powders. An important factor is that



Stocking many sizes of aluminum to fill special orders

was an expensive nuisance for a nationally known company

manufacturing lighting fixtures. But a call to the nearest

Alcoa Distributor met short run requirements promptly,*

saved warehousing and eliminated tie-up of capital.

*Your Alcoa® Aluminum Distributor can do as much for you. Look him up in the Yellow Pages of your telephone directory. Aluminum Company of America, 953-E Alcoa Bldg., Pittsburgh 19, Pennsylvania.

Your Guide to the Best in Aluminum Value

WE CHOSE ALCOA ALUMINUM MILL PRODUCTS
ALUMINUM COMPANY OF AMERICA

THE ALCOA HOUR—Television's Finest Live Drama—Alternate Sunday Evenings ★ FASTEN ALUMINUM WITH ALCOA ALUMINUM FASTENERS

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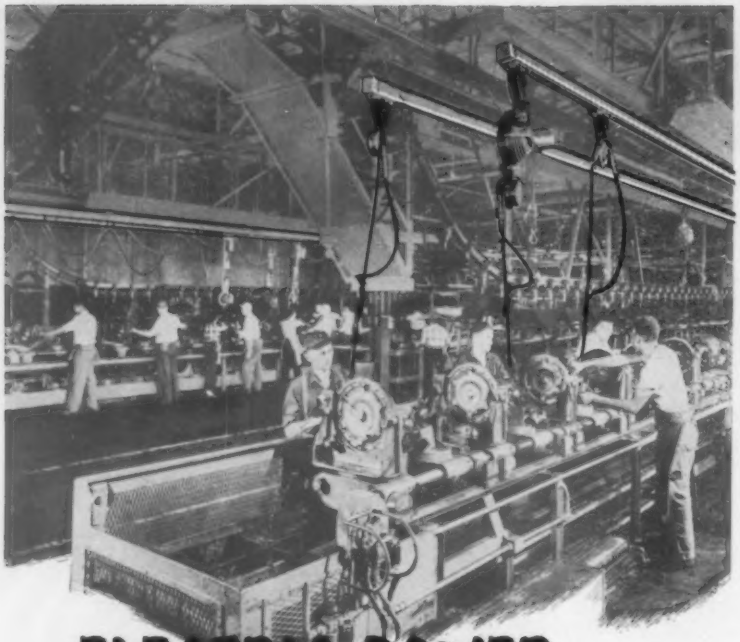

ELECTRIC POWER
where you want it...when you need it!

FEEDRAIL® TROLLEY BUSWAYS

● Get acquainted with industry's most modern, most flexible, most convenient system of electrical distribution — FEEDRAIL Trolley Busways. Here's the electrification system that's made to order for fast, low-cost assembly and production.

Installed over work areas, FEEDRAIL provides a continuous, uninterrupted source of electric power. Through its easy rolling trolley outlets, the power can be brought to the work — or move right along with it. Any tool or machine used on an assembly line can be powered by FEEDRAIL. If new tools are put into service, additional trolley outlets can be quickly and easily inserted in the track without shutting down power — and without interrupting work in process.

And, should future plans require extensive changes in your production set-up, FEEDRAIL can be quickly dismantled and reinstalled in another area to serve an entirely different operation.

P4-1

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Subsidiary of Russell & Stoll Company, Inc.
Dept. P-5, 125 Barclay St., New York 7, N. Y.

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Please send information on FEEDRAIL TROLLEY BUSWAY Systems for:

☐ Cranes and Hoists ☐ Production Lines
☐ Test Lines ☐ Other Applications (please specify)

Name Title

Firm

Address

City State P-5

For more facts circle 588 on Reply Card

NEW PRODUCTS

(Begins on page 136)

flexible control of the feed rate is readily obtainable with the Hi-Vi Remote Controller which uses only a rheostat to vary the voltage across the unit.

Heart of the unit is an enclosed drive element combining an electro-magnet with a powerful Alnico V permanent magnetic armature, to which is added the driving force of the energy stored in the two rugged steel springs between which the drive element is mounted. This magnetic system acts to alternately pull down and back, and then push up and forward on a tray assembly. As the tray is pulled down and back, the material in the tray falls forward to a new position. This action repeated at high speeds, causes the material in the tray to move forward in a series of small "hops." Three standard models of the Eriez Vibratory Feeder are designated the FE-2, FE-4, and FE-10, according to their design ability to move 2, 4 or 10 tons of dry sand per hour in normal operation. Eriez Mfg. Co.

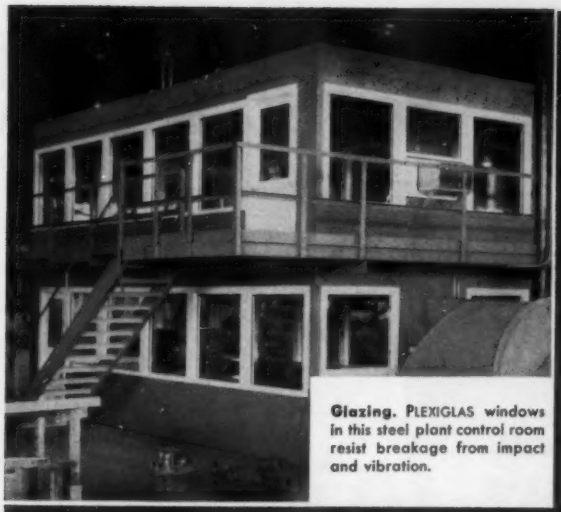
It's easy to obtain product data with the postage-free Reader Service Cards provided on pages 207-208. Use them for information on advertised products, too. Just circle the key number appearing at bottom of the ad.

18—TUBE-CLEANING MOTORS are air driven units

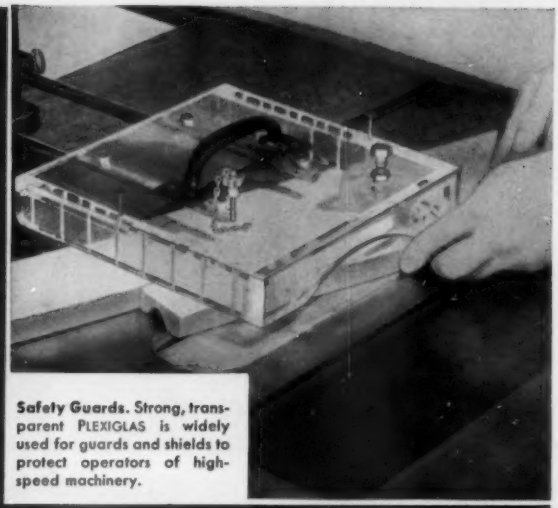
Two new models of air-driven motors for driving shafting equipped with drills or brushes for cleaning small, straight tubes power these gun-type cleaners. They are designed for use particularly where suspension type cleaners cannot be used. They are light, but powerful, have gun grip handles with trigger valve as well as a second holding handle. The units use ⅜ in. hose with ¼ in. thread and require 15 to 20 cfm of air at 90 psig. The motors are equipped with built-in governor and oil reservoir, also with water-feed valve and non-rotating water-feeding attachment. Larger model has a side handle which can be shifted to any desirable position. On smaller model, the water inlet hose connection also serves as a second handle. The Lagonda Div., Elliott Co.

19—ALL-PURPOSE LUBE offers economy, other benefits

Primaleen can be applied up to 90 times less frequently than most greases, says manufacturer, and its tenacity and ability to fill the pores of the surface lubricated make it outstanding in reducing friction at high pressures, high sliding velocities and close tolerances. Possessing thixotropic characteristics, it will not drip

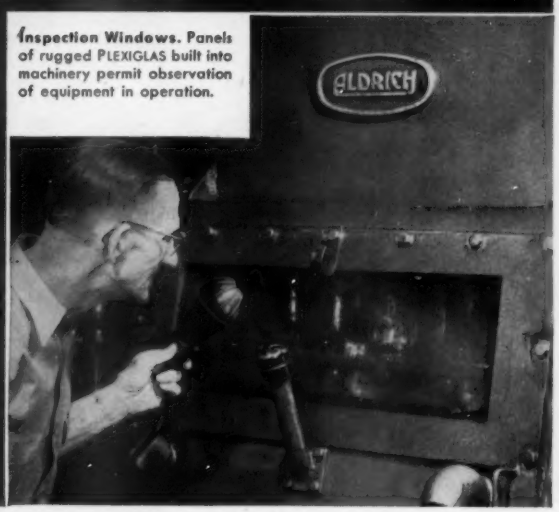


Glazing. PLEXIGLAS windows in this steel plant control room resist breakage from impact and vibration.



Safety Guards. Strong, transparent PLEXIGLAS is widely used for guards and shields to protect operators of high-speed machinery.

Covers. Thermoplastic PLEXIGLAS can be formed into covers and hoods that protect materials in process from contamination.



Inspection Windows. Panels of rugged PLEXIGLAS built into machinery permit observation of equipment in operation.

Plexiglas—useful in so many ways around the plant

PLEXIGLAS® acrylic plastic can do many important jobs around a plant. The examples shown above indicate just a few of the ways it is being used to solve safety, maintenance and operating problems.

Put these advantages of PLEXIGLAS to work in *your* plant:

- Great strength, light weight and crystal-clear transparency.
- Resistance to corrosive atmospheres.
- Excellent electrical properties.
- All-weather durability.
- Formability to almost any shape.
- Machining characteristics like those of wood or soft metals.

PLEXIGLAS R, the lower-cost grade, is especially suitable for industrial plant applications. Call your nearest dealer for information and quick delivery. Dealers are listed under PLEXIGLAS in classified telephone directories of most large cities.

Send for this free booklet.

PLEXIGLAS Design and Fabrication Manual tells how to work with cast acrylic plastic sheets.

Chemicals for Industry

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

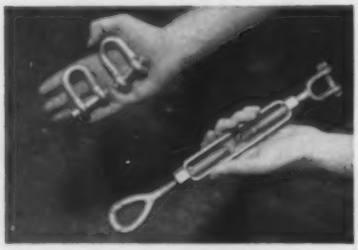
Representatives in principal foreign countries

Canadian Distributor: *Crystal Glass & Plastics Ltd., 130 Queen's Quay at Jarvis Street, Toronto, Canada.*

For more facts circle 589 on Reply Card

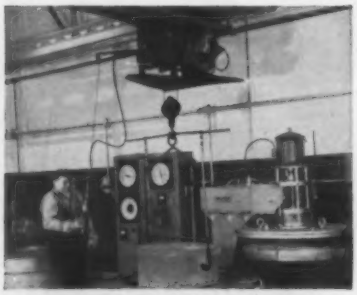
"SAFELY DOES IT" AT DESOTO PLANT

In the automotive industry, as in manufacturing plants across the nation, the emphasis is always on safety. In the mammoth DeSoto Plant, a car body, above, moves smoothly and efficiently along the assembly line secured *safely* to the body-drop hoist with 28 Crosby Clips. Everywhere, workmen recognize and know they can depend on the clip with the Red-U-Bolt—genuine *safe* Crosby Clips. Today, Crosby Clips safeguard more men and equipment than any other drop-forged wire rope fasteners.



EXCLUSIVE TURNBUCKLE EYE INCREASES USEFULNESS

A pear-shaped turnbuckle eye designed to take the ear of a shackle one size smaller, as well as the standard shackle, is another exclusive product developed for efficiency in industry by the Thomas Laughlin Division of American Hoist & Derrick Co. Industrial users report that Laughlin's exclusive double-duty eye not only rates the approval of workmen, but also helps cut their turnbuckle inventory.



MEN, EQUIPMENT PROTECTED

A positive means of avoiding accidents due to overloaded blocks is provided industry by Load-Rated Crosby Blocks. Workmen know that the Crosby Block they're using is right for the job, and that valuable equipment is protected because the safe working capacity is *embossed right on the side-plates*. Load-Rated Crosby Blocks and genuine Crosby Clips are products of the Crosby Division, American Hoist & Derrick Co., St. Paul 1, Minnesota.

CUTS HOIST ACCIDENTS

To help eliminate the major cause of hoist accidents—loads slipping or jarring off the hook—safety-conscious industrial users in plant after plant are switching to Laughlin Safety Hooks. A powerful snap-spring latch on drop-forged Laughlin Safety Hooks guarantees that loads cannot be jarred from the hook and prevents overloading with too many lines. Laughlin Safety Hooks are part of the famous Laughlin line—the world's most complete line of fittings for wire rope and chain. For complete catalog, write: Thomas Laughlin Division, American Hoist & Derrick Co., St. Paul 1, Minnesota, or Portland, Maine.

For more facts circle 590 on Reply Card

NEW PRODUCTS

(Begins on page 136)

even when afire, it is claimed; and it resists water, chemical vapors, and temperature changes. Primaleen is suggested for conveyors, bearings, slides, gaskets, packings, gears, shafts, guide pins and die sections, valves and stems, others. Other benefits cited for this lubricant include protection against rust resulting from soluble oils; no crystallization and no flaking at -30 F. Open cup flash point of Primaleen is given as 355 F. Protecto-Lube Co.

20—INSERT RINGS improve welding of piping, tubing

Consumable solid insert rings are announced as offering several benefits—the inert-gas tungsten-arc welding of piping without backing rings, smoother root pass welds with elimination of root pass cracking and improved weld contours in thin wall piping with one or

two fewer passes. On piping of wall thickness over ¼ in., the insert ring assists in obtaining root pass welds of uniform and smooth contours, free of crater and center-line cracks, it is noted, and the completed root pass weld provides an effective back-up for the subsequent shielded metal-arc welding with covered electrodes.

On thin-wall piping, as Schedule 5 and 10 stainless steel, the insert ring is claimed to improve weld contour. On many sizes, it also eliminates need for separately supplied filler metal and necessity for one or two additional weld passes, says company, and this reduces welding costs. The consumable solid insert rings are produced for standard and special pipe and tube sizes of 1½-in. diam or larger in mild steel, several alloy steels and stainless steels. Grinnell Co., Inc.

21—THERMOPLASTIC will not support combustion

Homalite 101, described as a strong, clear thermosetting plastic with unusual properties, does not support combustion and is said to have the highest heat resistance yet developed. Manufacturer states that although it chars when direct flame is applied, it will not continue to burn when flame is removed. Clear and almost colorless, material provides scratch resistance and is reported to be a better thermal insulator than glass, as well as being insoluble in every known solvent. It can

VULCATEX® *lasts longer . . .*

makes caulking easier

Vulcatex does a more dependable job because it forms a tough, weather-resistant outer skin, yet stays live and resilient underneath. It resists vibration, will expand and contract without losing its bond or cracking.

Vulcatex Thriftpaks are quick and economical . . . eliminate messy gun loading and cleaning. No waste, no hardening in the container. Hermetically sealed packs assure that Vulcatex is always in factory-fresh condition . . . not thinned or adulterated in any way. Vulcatex, in Thriftpaks or bulk, is available in gray or white from your favorite dealer, or from one of our conveniently located offices.

FREE OFFER!

A FREE caulking gun will be supplied with *each* purchase of a Thriftpak Unit (Unit consists of one hundred individual Thriftpaks—approx. total: 10 gallons).

This offer is valid only during the month in which this ad appears, and in the United States and Territory of Hawaii (unless State laws prohibit).

A Subsidiary of Sun *Chemical Corporation*

A. C. Horn Co., Inc.

10th Street and 44th Avenue, Long Island City 1, N. Y.

DIVISIONS OF SUN CHEMICAL CORPORATION

HORN • **HUDSON** • **WILLEY** (paints, maintenance and construction materials, industrial coatings) • **WARWICK** (textile and industrial chemicals) • **WARWICK WAX** (refiners of specialty waxes) • **RUTHERFORD** (lithographic equipment) • **SUN SUPPLY** (lithographic supplies) • **GENERAL PRINTING INK** (Sigmund Ullman • Fuchs & Lang • Eagle • American • Kelly • Chemical Color & Supply Inks) • **MORRILL** (news inks) • **ELECTRO-TECHNICAL PRODUCTS** (coatings and plastics) • **PIGMENTS DIVISION** (pigments for paints, plastics, printing inks of all kinds) • **A. C. HORN COMPANY LIMITED (Canada)** • **FUCHS & LANG de MEXICO, S. A. de C. V.,** **GENERAL PRINTING INK CORPORATION OF CANADA, LIMITED.**

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FOR METERING

5,000 cfh or a MILLION

R-C *plur-ability*

PAYS DIVIDENDS

Look for R-C plur-ability in all your equipment to handle gas and air

Centrifugal and Rotary Positive Blowers, Gas Pumps and Exhausters

• • •

Spiraxial® Compressors

• • •

Positive Displacement Vacuum Pumps and Meters

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Inert Gas Generators

• • •

Ask for detailed bulletins on any R-C product—or write us your needs.

Packed into every Roots-Connersville Positive Displacement Gas Meter are important values which mean *"plur-ability."* Summed up, they give you accuracy unmatched by any other type—that endures over many years of use. Maintenance is practically unknown, with no vanes, valves, or small parts. Compactness saves space and foundation cost. Capacities, pressures and overload ability fit your most exacting needs. Wherever you need to measure gas from 5,000 cfh to a million, you can trust the staying qualities of R-C Positive Displacement Meters. Ask for specification details in Bulletin M-152.

ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

556 Power Ave., Connersville, Indiana. In Canada—629 Adelaide St. W., Toronto, Ont.

For more facts circle 592 on Reply Card

NEW PRODUCTS

(Begins on page 136)

be sawed, drilled, bored and machined, much like metal. Homalite 101 comes in standard sheets, 24-by-30 in. Larger sizes or specially cast shapes and colors may be obtained. The Homalite Corp.

22—FOLDING RULE simplifies rafter layout work

The Master Framing Rule is a 6-ft folding wood one with special markings on the reverse side, reported to enable plant crews to lay out rafters (common, hip, valley and jack) with unusual speed, accuracy and simplicity. The new tool works by manipulating angular folds to form triangles, the bases of which are

merely held along the side or edge of the lumber. Adjustment for each desired triangle is by placing a notch in the metal end of the rule over the proper bull's-eye on the reverse side of the rule and holding this adjustment under the thumb while the angular cut is marked. It is pointed out that the Master Rule comes as an extra feature on the back of a regular folding rule, and is precalculated so that there is no guesswork in measuring the exact length of rafters of any type on the basis of a known "run" and a desired "rise" of roof. The rule has special markings so that it can also be used as a square, for miter cuts, and for laying out any angle from 0 to 90 deg. Additional advantages in maintenance work are: it is handy as a device for finding the pitch (or rise) of an existing roof; it has special markings for shed pitches; and it converts inches-and-fractions into hundredths-of-a-foot, and vice versa. The rule sells for around $3.00. Master Rule Mfg. Co.

23—SWITCH signals pressure rise or fall to danger zone

The Model 432 Meletron Pressure Switch may be used to signal when pressure rises or falls to danger zone and then to shut down the system if pressure continues to rise or fall to a predetermined safety limit. Manual reset is so arranged that system cannot be reactivated until pressure has been returned to a safe level. Each switching element in the unit can be electrically independent of the other, (one a-c, the other d-c if necessary), or two external leads can be supplied to control a single circuit between maximum and minimum pressures. Switch comes in three classes of proof

Whatever the LIGHTING PROBLEM in front of you...

thousands of BENJAMIN Quality Lighting Systems assure you of a Superior Solution

Superior Solutions to lighting problems require the *precisely right lighting system* for the seeing task and environment, plus *quality lighting units* built to deliver this lighting at lowest-per-year cost. With Benjamin you get both.

You get the precisely right lighting system, because Benjamin's line is so complete that thousands of different lighting systems can be created from it. You get lowest-per-year cost, because every Benjamin Unit has the quality and durability which 50 years of experience has proved to be essential.

Get a Superior Solution to your lighting problem! Start now by sending for FREE data bulletins on Benjamin Units for specific plant locations.

Benjamin Electric Mfg. Co.
Dept. PE, Des Plaines, Ill.

Certified Lighting for a Better America

SUSTAINING MEMBER
ILLUMINATING ENGINEERING SOCIETY

1. "Explosion-Proof" Units
2. "Vapor-Tight" Incandescent
3. "Magna-Flo" Continuous Lines
4. "Lite-Line 40" Rows of Light
5. "Magna-Flo" w/27° Lamp Shielding
6. "RLM Dome" Reflectors
7. "Magna-Flo" w/Plastic Covers
8. "Elliptical Angle" Reflectors
9. "Steelite" Armor-Clad Units
10. "Magna-Flo" Individual Units
11. "Symmetrical Angle" Units
12. VOUL Units w/25% Uplight
13. All-white 'Diffuser" Reflectors
14. "Sky-Glo" Translucent Ceilings
15. "Stock-Bin-Lite"
16. "Officer" Louvered Units
17. "Panel-Glo" Plastic Ceilings
18. "Varsity" Low-Cost Fluorescent
19. "RD" Projectors
20. "Vapolets" Vapor-Tight Units
21. "Duo-Service" Floodlights

BENJAMIN
TRADE MARK

LIGHTING EQUIPMENT
Sold Exclusively through Electrical Distributors

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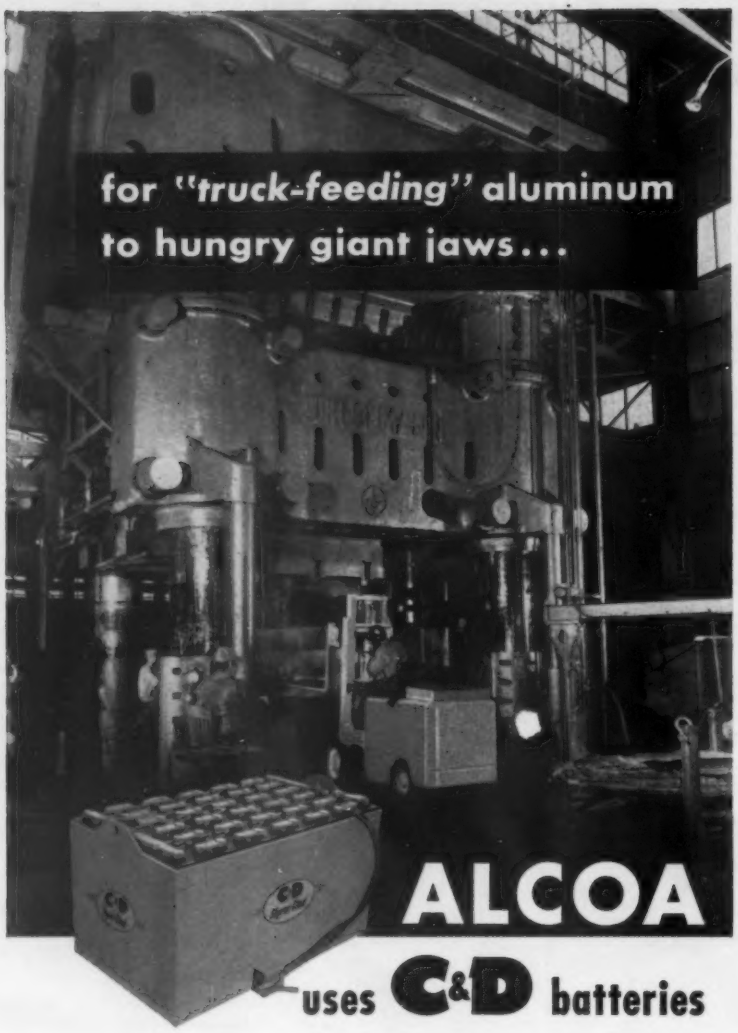


It takes a lot of aluminum to keep this mammoth filled. And this is just one of many giant presses at Alcoa busy shaping the millions of Alcoa® Aluminum products used throughout America's armed forces, homes, and industry.

To help solve vital material handling problems, Aluminum Company of America uses C&D Slyver-Clad® batteries as a major source of power for the electric industrial trucks used in its daily operations.

C&D Slyver-Clad batteries are approved as standard equipment by all electrical truck manufacturers. For further information, write for Catalogs.

C&D BATTERIES, INC.
of Conshohocken, Pa.
INDUSTRIAL BATTERIES SINCE 1906
SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST
For more facts circle 594 on Reply Card

NEW PRODUCTS

(Begins on page 136)

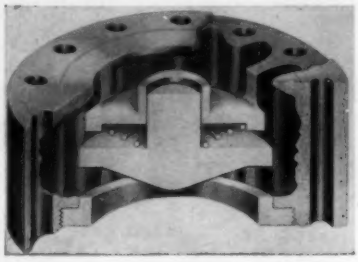
pressures; 6, 30 and 120 psi, with an adjustable range from 0.05 to 100 psi. List price is about $28. Pressure Switch Div., Barksdale Valves.

24—CABLE REEL for storing heavy electrical cable

Cable not in use can be kept safely out of work areas and away from possible damage with the use of this cable reel. Operator need only unwind the length needed for each job. To put cable back on drum he merely presses a push button switch to start the explosion-proof electric rewind motor. Control is set up so that cable cannot be accidentally rewound while being used. Custom built for each application, reel can be mounted in cabinets or on walls and girders. An angle-iron frame anchors the reel in place, and added protection is provided by rolled edges on drum discs, and by smooth drum design, to prevent scuffing and cutting. Reel is available with electric motor or geared hand crank rewind. Clifford B. Hannay & Son, Inc.

25—SILENT CHECK VALVE for control of water hammer

This simplified flanged silent check valve, Williams-Hager Figure 454, is suggested for control of water hammer for all



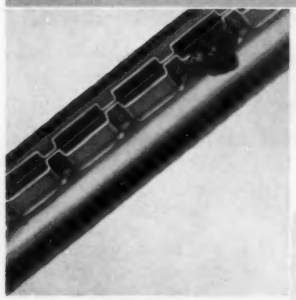
types of hot or cold liquid service—including water, oils, gasoline, acids, chemicals, salt water, brine—where flow is constant. The unit has been developed to provide a lower cost valve without sacrificing water hammer control and durability features, company states. It is available in sizes from 1 to 10 in., faced and drilled in accordance with ASA standard for pressures from 125 to 2500 lb. The valve can be furnished with special flange facings, including large male and female, ring joint, and large tongue and groove. The Williams Gauge Co., Inc.

26—MATH CHARTS speed up calculating jobs

Calculine Mathematical Charts provide a convenient, economical tool used for the same purpose as a slide rule or calculating machine. The two charts, furnished on heavy 8½-by-11 in. card stock, consist of a log scale superimposed diagonally on a log log grid. The multiphase mathe-

The Magnificent Modine

establishes a new concept in gas unit heater styling and performance

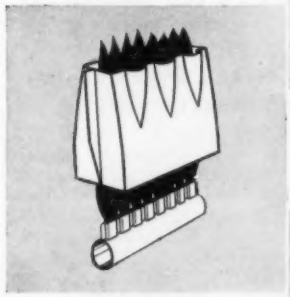


SELF-CLEANING PORTS

Knife-sharp stainless steel ports have four times the free area of drilled ports. Keen edges resist lodging of dirt and scale, maintain uniform flame.

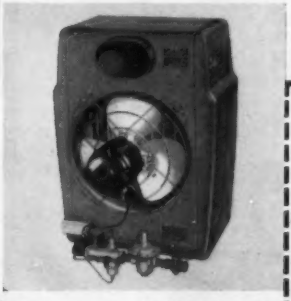
IMPROVED COMBUSTION

Hooded combustion air inlets directly below each tube assure higher burning efficiency, minimize flame disturbance, eliminate combustion chamber.



FASTER, MORE UNIFORM HEAT

Continuous, uniform flame from front to rear of individually and directly-fired tubes boosts radiant heat absorption and uniform heat distribution.



SAFETY MEASURE

Sturdy guard protects against hazards of exposed fan and provides resilient suspension for motor and fan assembly, further reducing vibration noises.

HERE at last is a gas unit heater so strikingly beautiful it can be installed with pride in the finest industrial, commercial and institutional buildings. Truly distinctive lines and attractive soft green finish are accented by sparkling medallion, grilles and panel of polished chrome. Yes, the new Modines are in a class by themselves—thanks to the skill of famous designer Jean Otis Reinecke.

And the new Modines are as great as they look—in performance, in economy . . . in safe, trouble free operation. Check the benefits shown at left. And, remember—improved *stainless steel* burners, plus a choice of *stainless or aluminized steel* heat exchangers, make Modines up to *50% lighter* than other units . . . less expensive to ship and install.

Ask the Modine representative listed in your classified phone book for full facts on the eight AGA-approved sizes—25,000 to 310,000 Btu. Or use the handy coupon below.

MODINE MFG. CO.
1563 DeKoven Ave., Racine, Wis.

Please send me immediately a free copy of new bulletin, "The Magnificent Modine Gas-Fired Unit Heater"

Name .....

Firm .....

Address .....

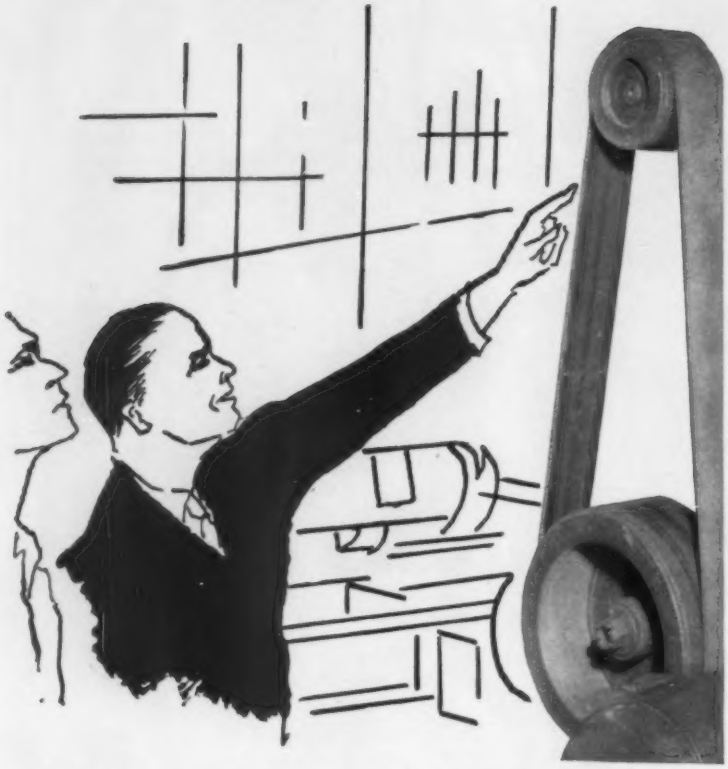
City ..... Zone ..... State .....

GU-1307

Modine
GAS UNIT HEATERS

In Canada: Sarco, Ltd., Toronto

For more facts circle 595 on Reply Card



How often should you replace a leather belt?

just look at these reports on Tannate

Experience proves that, in Industry after Industry . . . plant after plant, **Tannate Flat Leather Belting** is made to last, and to give smooth, efficient transmission of power on important drives.

A metal working plant reports that Tannate Belt gave over seven years service compared with 18 months for the best belt previously used. Savings in belt replacement costs alone mounted to $800.00.

One firm installed 37 **Tannate** short center belts. After 14 years continuous running, they're still in operation without a shutdown. Another plant reports 17 years uninterrupted service with Tannate—two to three times longer than previous ordinary leather belts. Still another plant states that, under difficult conditions, with Tannate there has been definite reduction in slip and an increase in actual HP transmitted. Downtime and maintenance costs were considerably reduced.

These same operating advantages and economies are available to you. Write J. E. Rhoads and Sons, 2100 West 11th Street, Wilmington 99, Delaware.

RHOADS

INDUSTRIAL LEATHERS

Wilmington New York Chicago Atlanta

For more facts circle 596 on Reply Card

NEW PRODUCTS

(Begins on page 136)

matical chart includes scales for multiplication and division as well as those for obtaining directly the square root, cube root and logarithm of a number. The multiplication and division chart has the same pattern, but without the log, square and cube root curves. Both charts contain examples of mathematical operations which can be performed. Values on the chart can be read directly without the use of a straight edge, and the operator has a free hand to record values. These charts are suggested for field calculations, because they can be inserted in the back of notebooks for ready reference. Or they can be placed under a glass desk top. Frederick Post Co.

Use the Reader Service Cards provided on pages 207-208 to ask for more information on these products. Circle item numbers of products in which you are interested.

27—EPOXY COATINGS will coat at low temperatures

All-Coat Epoxy Coatings are based on the use of catalysts to provide, in an air-dry system, the properties generally obtainable only with high-temperature baking. This permits coating of items too large or otherwise impractical to bake, such as chemical process equipment, water towers and tanks. These coatings are said to cure at temperatures as low as 40 F. Tests are reported to show that they have excellent adhesion, abrasion resistance, toughness, flexibility and resistance to acids, alkalies and solvents. Shutt Process Equipment Co.

28—CONTROL PANELS offer improved circuitry

Designed for the specific control of a process or machine, complete control systems are available for explosion-proof operation as well as for dust-tight, watertight, drip-proof or for regular commercial use. Each system is compactly engineered, says manufacturer, and features improved circuitry specifically designed to maintain reliability. Typical examples include discharge gas dust collecting controls, automatic operation of wet pit pump networks, liquid batch mixing controls, air filter collection system controls, sequencing control panels and demineralization panels. Devco Engineering Inc.

29—PROTECTIVE FABRIC for the cover-up jobs

Herculite, a comparatively new protective fabric, handles like silk, yet is as strong as steel mesh, says manufacturer. A laboratory developed combination of

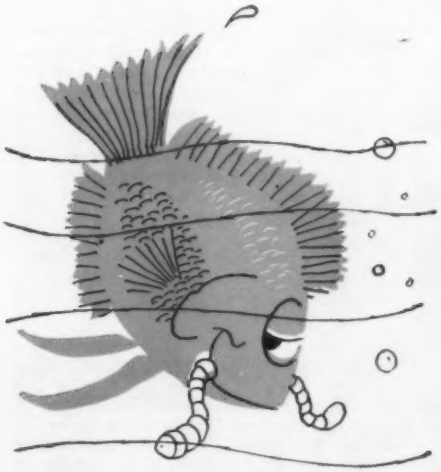
in fishing, all you can lose is the fish...

There's a lot of evidence to prove that we get just about what we pay for in this world, whether it's fishing tackle or lubricants.

When we sacrifice quality in the Isaac Walton department, the loss is usually limited to fish. But a compromise with quality in lubricants can be costly. It can result in excessive wear, down time, and needless maintenance expense. In any case, the costs of faulty lubrication are far greater than the small savings possible through the purchase of unsuitable lubricants.

When you think of quality lubricants, think of Gulf. The tough film, outstanding rust preventive properties, and excellent stability of Gulf lubricants are your assurance of efficient, continuous machinery performance. In fact, many plants have found that through the use of Gulf Quality Lubricants they have saved more than enough to pay the entire bill for oils and greases!

Remember too that Gulf provides the cooperative counsel of experienced engineers to help insure the proper application of the right lubricants for every unit of equipment and operating condition. Consult the telephone directory for the number of your local Gulf office and have a Gulf Sales Engineer call.



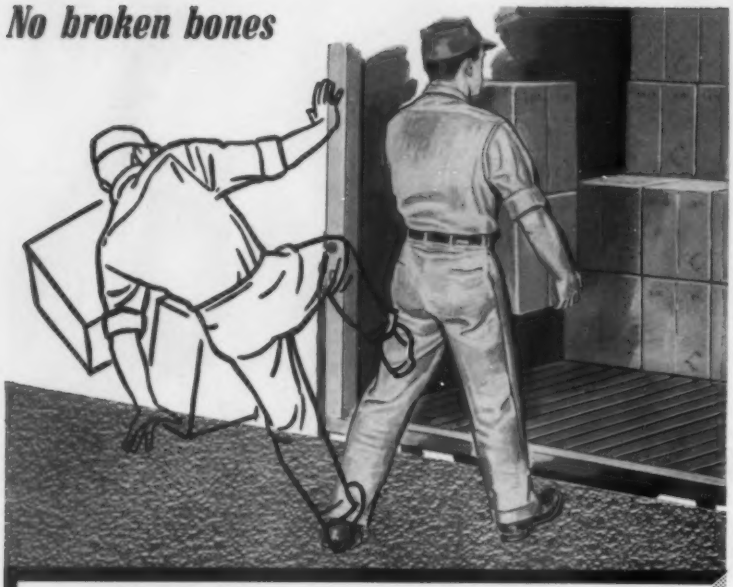
Gulf Oil Corporation · Gulf Refining Company
1822 Gulf Building, Pittsburgh 30, Pa.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

For more facts circle 597 on Reply Card

No broken bones



The Accident did NOT happen *thanks to* A.W. ALGRIP

World's only abrasive rolled steel floor plate

No slip!

Except in accident and insurance rates!

Because neither oil, grease nor water—on flat or inclined surfaces—can reduce the powerful friction grip of ALGRIP'S uniformly embedded abrasive particles.

ALGRIP'S abrasive is rolled in—*not coated*—to a controlled depth as an integral part of the steel plate. Wear and tear merely expose more abrasive. ALGRIP, made by a patented process, fabricates easily—maintenance is practically nil.

Make a test installation in your worst slipping area. Watch accident rates go down.

A.W. ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE

ALGRIP—*approved for safety by Underwriters' Laboratories.*

ALAN WOOD STEEL COMPANY
Conshohocken, Pa.

Please send A.W. ALGRIP Booklet AL-29

Name _____

Title _____

Company _____

Address _____

City _____ Zone ____ State _____

Other products: A.W. SUPER-DIAMOND Rolled Steel Floor Plate—Plates—Sheets—Strip—(Alloy and Special Grades)

For more facts circle 598 on Reply Card

NEW PRODUCTS

(Begins on page 136)

nylon and special plastic, it is claimed impossible to tear even when cut, regardless of the amount of tension exerted. Other features announced are: Herculite will not support combustion; it is waterproof; is unaffected by acids, grease, oil, corrosive effects of salt water; is effective under all weather conditions. Cargo covers, equipment covers and tarpaulins are among uses of Herculite because it is so light in weight only one man is required to pull such covers on and off. Herculite Protective Fabrics, Inc.

30—WINDOW WALL has sliding glass inserts

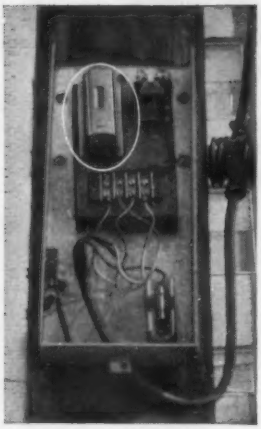
This partition-to-partition aluminum window wall with sliding glass inserts is reported to cut purchase, installation and maintenance costs. Believed by its manufacturer to be the largest of horizontal sliding window walls, this one offers the added advantage of eliminating exterior

window-washing and glazing. It was designed for use where large windows or long lines of continuous ones are desired. It may be installed with or without aluminum or plastic surfaces, hollow-core insulated panels around window to finish off the balance of the exterior wall. It comes in heights to 5½ ft, widths as required. Company says it will be marketed, before installation and glazing, at a cost of about a dollar a square foot.

This low price is attributed to the use of standard-size glass in interchangeable vents, plus elimination of many small framing members and hardware parts. The vents, sliding in stainless steel weather-stripping on nylon roller bearings, provide easy operation of the window. Center compartments can be fixed or sliding. There will be extra vents available in the same size as those in the installed window wall. These can be washed or glazed elsewhere and brought in for speedy replacement. Luria Building Products, Inc.

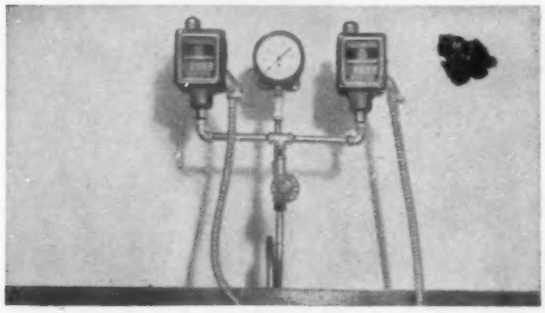
31—BELT GRINDERS feature rubber contact wheels

Four improved models of the Delta 2½ in. Belt Grinder featuring new rubber contact wheels and improved alignment adjustment are being introduced. Wheels are reported to enable user to obtain a better finish in less time and reduce costs by increasing life of abrasive belts. Hubs are designed to accommodate standard tires 2½-in. wide and 6-in. diam.



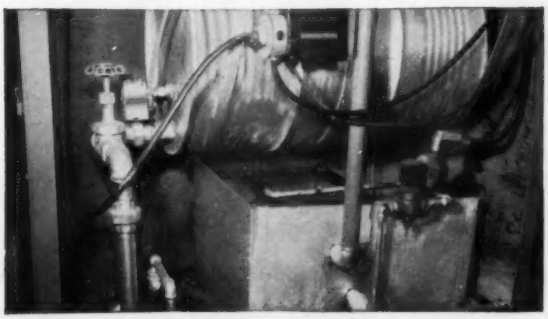
Power factor correction capacitors at Kansas City Power & Light are switched in when temperature changes . . . to compensate for air conditioning loads. Honeywell Industrial Thermostat on the utility pole does the job . . . at much lower cost than usual current control devices.

Honeywell Controller Cost $19.00*



Hosiery mill steam plant saves $1175 in fuel yearly by installing a pair of Honeywell Pressure Controllers, which make it easy and foolproof to switch from high pressures for peak production to low pressures for supplying night shift and weekend needs.

Honeywell Controller Cost $40.00*



Water consumption is reduced at Atwood Vacuum Machine Co., Rockford, Ill. A Honeywell *Aquastat* temperature controller and solenoid valve turns on a spray of tap water to reduce temperature of the coolant only when needed . . . with resultant decrease in water consumption.

Honeywell Controller Cost $12.50*

***Approx. cost. Prices subject to change without notice.**

Honeywell Industrial Controls

Reduce costs

Don't overlook these simple, low-cost controllers...they're the ideal solution to hundreds of problems

Cutting costs for materials, fuel or utilities doesn't always call for elaborate automatic control equipment. In scores of spots around your plant, you can effect substantial savings by putting simple, inexpensive Honeywell Industrial Controls on the job.

By regulating temperature, pressure, vacuum, liquid level or humidity, these versatile controls can help you avoid waste . . . reduce rejects . . . save manpower . . . prevent down-time. More than 7000 different models give you an unequalled variety from which to choose. They're simple, rugged and dependable . . . and cost surprisingly little. Readily applied to any kind of equipment, they can improve safety, protect quality of production, increase output and minimize maintenance in hundreds of different ways.

This comprehensive line of precision-made products is backed by the extensive application experience and world-wide service facilities of the largest manufacturer of controls. For a discussion of how they can be applied in your own plant, call your local Honeywell sales engineer . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

Also manufacturers of a complete line of precision measuring, recording and controlling instruments.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS

First in Controls

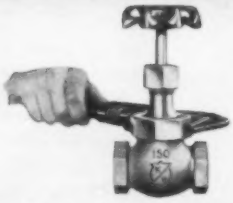
For more facts circle 599 on Reply Card

KENNEDY Quality Means *Extra Value* In Every Valve

The valve designed with rugged body construction for trouble-free service, with new disc features for longer service life.

Here is the bronze valve of maximum durability and efficiency. Designed for versatility and longer life, it has rugged body construction with raised seat, generous interior passages, and ample pipe thread clearances. It features the comfortable, safe, pistol-grip handwheel; the Kenalloy stem, designed to eliminate the common causes of stem failures; and new improved impregnated plastic packing material, carefully tested and perfected. All these factors combine to make Kennedy the Quality valve.

• UNION BONNET RING •



Separate union bonnet ring is of heavy construction to absorb greater punishment. Large flats mean easier wrench application.

• SLIP-ON DISC-HOLDER •

With stem turned to wide open position, slip-on disc holder is locked positively in place . . . for easy reassembly.

• REMOVABLE DISC-HOLDER •

With bonnet assembly removed, a mere half-turn of stem releases disc-holder. Accurately guided by four guide prongs.

BRAZING SOCKETS
Fig. 89 is available with brazing sockets. To specify, ad letters "BS" to Figure number of valve.

THE KENNEDY VALVE MFG. CO. • ELMIRA, N. Y.
VALVES • PIPE FITTINGS • FIRE HYDRANTS

OFFICE AND WAREHOUSES IN NEW YORK CHICAGO SAN FRANCISCO ATLANTA SALES REPRESENTATIVES IN PRINCIPAL CITIES

For more facts circle 600 on Reply Card

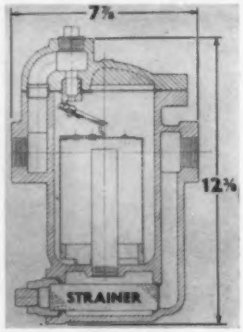
NEW PRODUCTS

(Begins on page 136)

For easier and more accurate belt alignment standard back stand idler units are designed to make possible lateral adjustment of drum. They also have hand knob control for belt tracking adjustment. Grinders are shipped as an assembled unit, are priced around $113.00 to $194.00. Delta Power Tool Div., Rockwell Mfg. Co.

32—STEAM TRAP with integral strainer for sediment

The No. 883, announced as the largest of four cast semi-steel integral strainer steam traps made by company, features an integral strainer which protects trap from harmful sediment, scale or other foreign particles that may be present in



steam lines. Trap is designed for use at pressures to 250 psig; capacity is 3500 to 4400 lb per hour of condensate. Side inlet, side outlet, screwed pipe connections are furnished either ¾ or 1 in. Standard screen material is stainless steel, perforated 0.045-in. diam holes, 226 to the square inch. Other materials are available. Integral mechanism of trap is all stainless steel with lapped valve and seat of hardened chrome steel. Materials, workmanship and design of internal mechanisms are identical to mechanisms in company's high pressure forged steel traps used for service up to 900 lb, 900 F. Integral strainer feature saves on installation labor, it is noted; it requires fewer fittings and costs less than a trap and separate strainer. Price is about $34. Armstrong Machine Works.

33—INSULATING VARNISH is based on epoxy resins

Thermopoxy T-653-LB is a thermosetting material based on epoxy resins and electrical insulation endurance in the presence of chemical atmospheres, moisture and radical temperature changes. Described as a non-catalytic varnish and having unlimited tank life, Thermopoxy T-653-LB can be applied by brush, dip, spray or vacuum impregnation. The material cures throughout upon exposure to a baking temperature of 135 to 150 C., says company, and upon curing develops

outlasts ordinary plastic skylights... SIX-TO-ONE!

NEW *Granitized** Corrulux®

Proven conclusively with accelerated erosion tests conducted by independent laboratories!

Surface erosion by wind, dust and sleet reduces light transmission of ordinary plastic skylights by as much as 50% in 2 to 3 years. Now . . . **new** *Granitized* CORRULUX with super-erosion-resistance, tested against competitive panels, gives up to six times longer service life . . . lasting beauty and light transmission.

Don't buy **any** plastic panel until you have checked new *Granitized* CORRULUX. Flat or corrugated, shatterproof! Three skylighting colors for your choice of light transmission.

See your local distributor or write

LOF GLASS FIBERS *Corrulux*

Corrulux® DIVISION

P. O. Box 20026 Dept. PE-56 Houston 25, Texas

*Trade Mark

For more facts circle 601 on Reply Card

Just a squeeze sets the fastening stud in steel or concrete!

THAT'S HOW SIMPLE IT IS—a flex of the finger—to anchor fixtures securely with the Remington Stud Driver. Off goes the power load, the stud is anchored into steel or concrete—straight as an arrow. No predrilling or outside power source required!

You can set both ¼" and ⅜" diameter studs with the Remington Stud Driver—up to 6 studs per minute either size. There are 40 different styles and lengths of Remington Studs to choose from. With this *one* tool, you can take on *every* stud-fastening job—light, medium and heavy-duty—and save time and money on every one of them! Get full details by mailing coupon below.

Remington

DUPONT

STUD DRIVER

Industrial Sales Division PE-5
Remington Arms Company, Inc.
Bridgeport 2, Conn.

Please send me your free booklet which shows how I can speed my job and save with the Remington Stud Driver.

*Name*_____ *Position*_____

*Firm*_____

*Address*_____

*City*_____ *State*_____

For more facts circle 602 on Reply Card

NEW PRODUCTS

(Begins on page 136)

a coating having exceptional adhesion and bonding strength. It is claimed to resist action of all types of chemicals including moisture, and also withstands exposure to temperatures from 55 C to 200 C. The Sterling Varnish Co.

34—PRE-CAST STACK for venting incinerators

Industrial and commercial plants sometimes hesitate to install an incinerator because a low-cost, permanent high-draft chimney is not available to vent the unit—this pre-cast stack offers a solution. Because it is factory-produced, the cost of the stack is low—about ⅔ less than a comparable brick stack, says manufacturer, and about the same as a

steel one. This is important, it is pointed out, because an incinerator installation may not warrant the cost of a brick stack, yet demands permanence and high draft. This stack will last about three times longer than a comparable steel stack, according to manufacturer, and the vermiculite concrete chimney sections are not affected by corrosive flue gases and can withstand temperature shocks, as well as flame impingement and abrasive action of particles in flue gases. The refractory insulation wall serves to prevent great heat loss, provide high draft.

This stack is designed to handle all fuels, and can be supported on the incinerator or built up from a footing beside it. The stack is made up of 3-ft-long sections cemented one on top of the other. Each section has an aluminum outer jacket. Six sizes from 10 to 24 in. ID are available. Van-Packer Corp.

35—BRONZE VALVES, throttling globe type

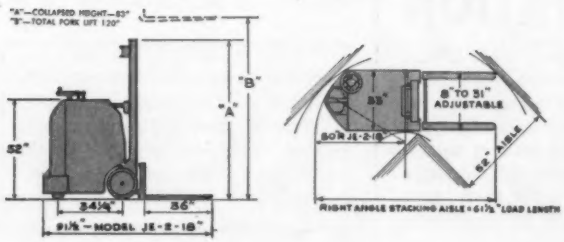
LQ600-200 Bronze Globe Valves, rated at 200 lb steam pressure and at 400 lb water, oil and gas pressure, are declared ideal companion valves to this manufacturer's 150-lb SP, 300-lb WOG valves introduced last year. Addition of the new line answers a need for a higher-pressure, throttling globe valve. Design and construction features of both lines are identical. Bodies and bonnets of the new valves, however, are made of company's S-1 bronze, a close-grained bronze reported to feature extremely high density, strength and corrosion resistance. Like the previously introduced

Model JEL-2 Aisle Saver. Cap. 2000 lb.

Right angle stack 61-½" plus load length.

Less aisle space... more storage space with Aisle Saver

Look at the Facts and Figures



Crescent Aisle Saver has the shortest turning radius of any heavy-duty cantilever fork truck. Extra aisle space, normally required for conventional truck operation, becomes valuable storage space.

Aisle Saver has wide load stability. Smooth, Barrett "stepless" acceleration from zero to full speed—no jerk through pickup range. Palletier sit-down center control models also available.

Let us know your storage area floor layout and specifications. Chances are we can suggest money-saving improvements. Write for Bulletin 5210.

BARRETT-CRAVENS COMPANY
618 Dundee Road, Northbrook, Ill.
Representatives in All Principal Cities
Canadian Licensee: S. A. Armstrong, Ltd., Toronto, Canada

CRESCENT
BARRETT
Barrett Handling Equipment

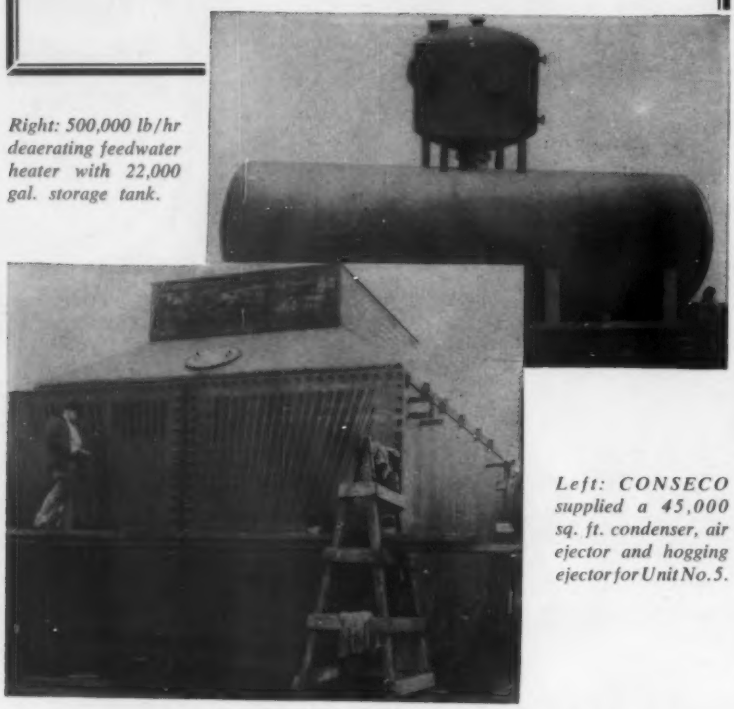
ONE MAN DOES MORE THAN 3 OR 4...WITH A BARRETT

Barrett-Cravens Company
618 Dundee Road, Northbrook, Ill.
Gentlemen:
Please send me bulletins on Crescent Aisle Saver and Palletier.

Name.....*Title*.....
Company.....
Address.....
City.....*Zone*...*State*.....

For more facts circle 603 on Reply Card

SATISFIED PUERTO RICO SENDS ANOTHER ORDER FOR CONSECO



Right: 500,000 lb/hr deaerating feedwater heater with 22,000 gal. storage tank.

Left: CONSECO supplied a 45,000 sq. ft. condenser, air ejector and hogging ejector for Unit No. 5.

FOR THE SAN JUAN STEAM ELECTRIC STATION

The San Juan Steam Electric Station of the Puerto Rico Water Resources Authority has been so satisfied with Conseco condensing and feed water heating equipment already installed and operating with Units 1, 2, 3, and 4, they ordered additional Conseco equipment, shown above, for Unit 5. The heating section on top of the 36½ ft. storage tank is 9 ft. in diameter, 10 ft. high, A.S.M.E. Code. This is the largest heating unit in the plant, part of the feedwater heating system for the 44,000 KW turbo generator system.

● *Call on CONSECO for emergency retubing, repairs and maintenance of any tubular equipment . . . any hour, any day (including Sundays, holidays) . . . anywhere on the continent.*

CONDENSER SERVICE & ENGINEERING CO., INC. CONSECO

Designers and Builders of Equipment for Power, Refining, Chemical and Marine Industries

72 BLOOMFIELD STREET
HOBOKEN, N. J.

For more facts circle 604 on Reply Card

NEW PRODUCTS

(Begins on page 136)

bronze valves, the new ones incorporate Brinalloy seats and discs for wear and corrosion resistance, Stemalloy stem for minimizing of thread wear, and flat-seat design—seats and discs are lapped to obtain a smooth, flat, leak-proof seal. Lunkenheimer Co.

36—PORTABLE BENDER does the work of four

This tool is designed to bend steel flat bar up to 2½ by ½ in.; round and rectangular steel and reinforcing steel bars to 1 in.; steel pipe from ¼ to 1¼ in.; and steel, aluminum and copper tubing to 1⅝ in. It may be mounted on truck, workbench, 4-in. or larger vise, or on a metal stand. Three models are available and prices start around $195. J. B. Sebrell Corp.

37—CONTROL VALVES in two simply-designed types

Designed to handle all fluids at unlimited pressures, are two new control valves—the diaphragm-actuated Type CV-D and the piston-actuated Type CV-P. The CV-D Valve has a wider range of application than company's older-styled diaphragm-actuated valves, and may be direct or reverse in action. Simple in design and easy to maintain, the CV-P Valve also has extreme rangeability, says manufacturer; this valve has desirable operating characteristics and its piston actuation develops high force to deal with static and dynamic unbalances and with stuffing box friction. Both valves will handle water, steam, air, gas, oil or other fluids at unlimited pressures. Each valve opening is designed to provide correct flow at all times. Valve bodies are made of cast iron or cast steel in straightway or angle style. Designed for individual installations, the fittings are stainless steel, single or double seat, with hardfacing if needed. Copes-Vulcan Div., Blaw-Knox Co.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 207-208.

38—MASONRY PAINT protects against water seepage

Silitex S.F. is a silicone cement base paint formulated to combat seepage and dampness in basements and on masonry walls. According to manufacturer, this paint penetrates into microscopic pores of even the most porous masonry, shedding water with a minimum of absorption, yet allowing the masonry to "breathe." In addition, it is extremely durable, company

at the 7th National Plastics Show!

Vinyl tells an exciting story about the future of your product at the Firestone Exon Booth No. 831-835.

In this exhibit of Exon, industry's most complete source of vinyl resins, you will discover how many new ways vinyl will enrich your product —and your profit picture.

Of very special note is a new and highly promising use of that remarkable plastisol resin, Exon 654. The new development, VINYLFOAM, has been proved outstanding in cushioning, safety, utility and economy.

This is new and dramatic evidence of the plastics industry's limitless opportunities, particularly in vinyl.

We expect Exon 654, with all its exceptional properties, to play a major role in its advancement . . . as all Exon resins are contributing to the growing significance of plastic in industrial and consumer life.

We invite you to be our guest.

SPI 7th national Plastics exposition new york coliseum June 11-15, 1956

Firestone

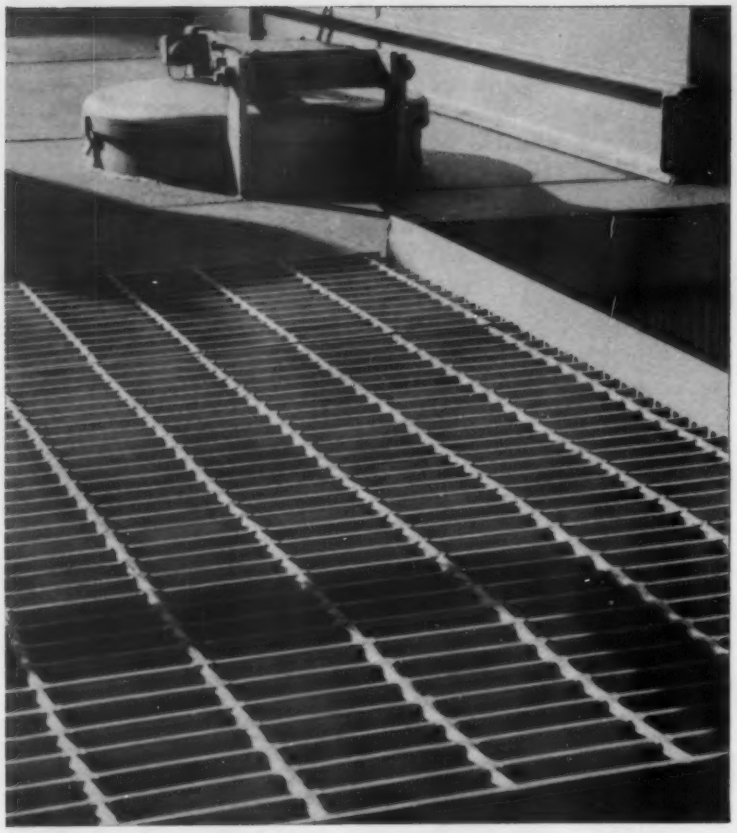
EXON

.... CHEMICAL SALES DIVISION

FIRESTONE PLASTICS COMPANY, POTTSTOWN, PA.

DIVISION OF THE FIRESTONE TIRE & RUBBER CO.

For more facts circle 605 on Reply Card



... make every step a safe step

BLAW-KNOX ELECTROFORGED®

STEEL GRATING and STAIR TREADS

Indoors or outdoors, you can provide safe walking conditions throughout your plant on floors, stair treads, platforms, walkways and catwalks. For Blaw-Knox Electroforged Steel Grating brings you these exclusive features:

1. rigid one-piece construction—easy to install
2. non-slip twisted crossbar—for safe footing
3. three types of bearing bars
   - square bars—for smoothest walking surface
   - knurled bars (Furro-Grip)—for extra safety plus relatively smooth walking surface
   - serrated bars—for maximum safety under extremely hazardous skid conditions
4. no sharp corners to clog—self-cleaning
5. all surfaces accessible—easy to paint
6. maximum open area—for light and ventilation

Write for your copy of new Bulletin No. 2486
—or send dimensional sketch for quotation.

50th Anniversary BLAW-KNOX 1906-1956

BLAW-KNOX COMPANY

BLAW-KNOX EQUIPMENT DIVISION

Pittsburgh 38, Pennsylvania

GRATING APPLICATIONS: floors • platforms • walkways • catwalks • stair treads • fan guards • shelving • and many other uses, both outdoors and indoors, for versatile steel grating

For more facts circle 606 on Reply Card

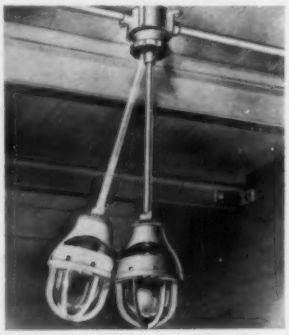
NEW PRODUCTS

(Begins on page 136)

claims, and will not peel or crack under severe weather conditions. Inclusion of metallic compounds in Silitex, S.F. is said to result in an exceptionally hard surface that forms a lasting chemical and mechanical bond with the masonry. This paint is suggested for any porous masonry surface . . . brick, cinder block, stucco and cement plaster. It comes in white, gray, green, rose and buff; it sells for around $4.00 a gallon. The Siliphane Corp.

39—FIXTURE HANGER is flexible-cushioned unit

According to manufacturer, this is the industrial lighting industry's first explosion-proof and dust-tight flexible cushion fixture-hanger; it is designed to eliminate damage to fixture and stem assemblies while supporting loads to 65 lb. Action of high-strength brass bellows is aided by a stainless steel cushioning spring, to permit movement of the fixture stem as



much as 15-deg from vertical in any direction. A set screw locks the threaded stem in place, and the stem assembly is designed not to turn or twist the wires or connections.

This fixture-hanger is announced as meeting NEC requirements for flexible support of pendant fixtures on rigid conduit stems longer than 12 in. One complete assembly of Condulet and cushion fixture-hanger does the job, says company; no bracing or separate flexible device is needed. Factory-assembled fixture-hangers with junction Condulets come in ½- and ¾-in. hub and fixture stem sizes. Also available are separate fixture-hangers for CPS Series Form 20 Condulets. Crouse-Hinds Co.

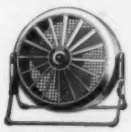
40—DEAERATOR for use in limited headroom areas

Particularly applicable in boiler rooms of single story plants and others where head room is limited, this line of deaerators comprises four sizes up to 80,000 lb/hr capacities. Larger capacities can be fabricated. Elevated installation isn't required. The new design consists of the standard steam-jet deaerator with a pump mounted below, forming part of the entire unit. Pump suction is connected to a

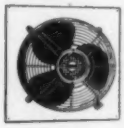
FREE! Your new guide to better plant ventilating!

1956 Westinghouse Fans for plant ventilating...

Whirlaires®



Rivieras®—for floor or wall use



Economy Exhausts

Desk-bracket Oscillators

Debonaire®

Super Mobilaire

Mobilaire®

All the facts on today's top line of fans!

Exhaust fans, ventilating units, man-coolers . . . the 1956 Westinghouse line includes fans job-engineered to handle problem ventilating assignments in your plant.

And this new Westinghouse Fan and Ventilator Catalog includes photographs, performance ratings, and specifications on the entire line of 1956 Westinghouse fans *plus* the inside story on the exclusive, patented Westinghouse Air-Injector Rings—that give *40% greater fan capacity*—and the Air-Jet Vanes—that give *50% greater air penetration.*

Mail coupon today!

All Westinghouse Fans are guaranteed 5 years.

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Westinghouse

Westinghouse Electric Corp.
Electric Appliance Division, PE-556
246 E. 4th St., Mansfield, Ohio

Gentlemen:

Please rush my free copy of the new 1956 Westinghouse Fan and Ventilator Catalog.

Name_____

Company_____

Address_____

City_____ Zone_____ State_____

For more facts circle 607 on Reply Card

penco—There's Economy in The **RIGHT** Equipment

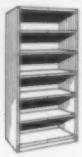
WHEN
DOLLARS
ARE
MEASURED
BY
INCHES

Whether your storage problem concerns office, plant, school, club, institution . . .

When your available space for shelving, cabinets or lockers means that you must have equipment *that makes every inch give full value* . . .

That's when your Penco dealer can give you planning assistance . . . and the versatile, adaptable, *extra-space* high-quality Penco steel equipment that means *more usable storage space* per dollar spent.

Write for Catalog PE



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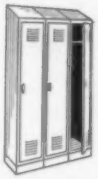
Steel Shelving

made from more than 700 component standard parts—permits versatility in assembly design . . . gives you the proportionate space you need for each type of storage.

penco
Steel Cabinets

the Quality Line—extra-big . . . and all with adjustable shelves . . . meet every storage and wardrobe problem. Girder-type construction; no sag or bend.



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Steel Lockers

come in standard sizes and designs which make available more than 300 combinations of standard types . . . including the one that fits your space and staff problem.

Planning for Your Service—Swift Service for Your Plans

Penco specialists in storage equipment engineering are available—at no cost to you—to assist in planning an efficient, practical shelving installation to meet your needs.

As a division of Alan Wood Steel Co., steelmasters for 130 years—Penco is assured the full supply of high-quality steel which enables it to make prompt delivery on all orders.

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Oregon Ave. & Swanson St. • Philadelphia 48, Penna.

For more facts circle 608 on Reply Card

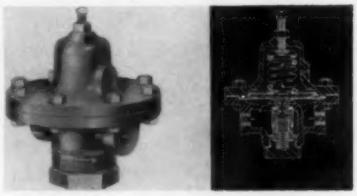
NEW PRODUCTS

(Begins on page 136)

large down comer which is equipped with an anti-vortex baffle and strainer. The high suction characteristics provided by this arrangement increase pressure of water leaving the deaerator to the pressure required at suction of the boiler feed pump. This design eliminates the necessity of elevating the deaerator above the boiler feed pump, it is explained, and thereby reduces supporting structures and piping arrangements. Use of company's deaerator recirculation design prevents pump from becoming vapor bound, it is noted, and provides maximum deaeration under abnormal operation. The new design permits recirculation of stored water through the deaerator. This operation heats the water and removes the oxygen before the water is fed to boiler. Worthington Corp.

41—CONTROL VALVE for liquids, steam and gases

This redesigned version of the Cash Standard Type D Pressure Reducing and Regulating Valve is announced as incorporating two major improvements: a 50 per cent reduction in number of



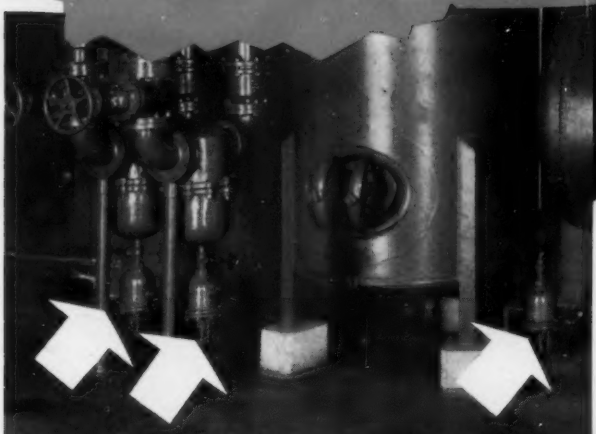
flange bolts to save maintenance time, and the use of a gasket seal at the diaphragm flange for easier pressure range conversion. Features retained from the former model include interchangeable internal working unit; easily accessible interior; simple construction with minimum parts; and built-in strainer. The new valve comes in iron, bronze, steel or stainless steel body, and bronze, stainless steel nitralloy or monel trim. Screwed ends are from ¼ to 2 in. Bulletin 950 gives data. A. W. Cash Co.

42—CIRCUIT BREAKER acts fast to protect wiring

This ambient compensated Quicklag Circuit Breaker, designed for 120-v a-c lighting and power distribution panels, acts with increased speed to protect circuit wiring, it is announced, and eliminates tripping due to ambients varying between 30 and 140 F. These combined features result from a "ten times rating" magnetic trip for short circuit protection so the 15-amp breakers trip magnetically at 150 amp. True ambient compensation is said to be provided by a bimetal element that permits full rated load in wide temperature variation. Instantaneous circuit interruption is delayed beyond the duration of peak cur-

Armstrong Air Traps

Make Compressed Air Systems Work Better



Automatic moisture removal prolongs life of compressed air tools—prevents moisture contamination of air at point of use...

SELECTION of air traps for automatic removal of moisture from intercoolers, aftercoolers, separators and drip points in compressed air systems involves consideration of these factors:

1. **Amount of condensate.**
2. **Air pressure.**
3. **Presence of oil in the system.**
4. **Trap cost.**
5. **Trap dependability.**

Armstrong manufactures a complete line of ball float and inverted bucket traps to meet any load or pressure requirements. The economies of mass-producing annually thousands upon thousands of castings, forgings and parts, many of which are used interchangeably in Armstrong steam and air traps, is reflected in exceptionally high quality at moderate price. All mechanisms are of wear- and corrosion-resistant stainless and chrome steels. All traps are unconditionally guaranteed to satisfy the user.

Three basic styles of traps are offered, as shown at the left, to provide the best answer to a given requirement. You will assure peak performance of your compressed air system, with minimum maintenance when you trap with Armstrongs.

Here are the high quality, low cost air traps to handle every job!

No. 71—$43.00 list.
Height 10⅜". Wt. 29 lbs.

No. 71 Snap Action Ball Float Trap. A spring strip snaps the valve open and shut, eliminating hunting, wire-drawing and trouble from fine dirt or light oil. Ideal for air line separators.

No. 21—$16.00 list.
Height 5¼". Wt. 8 lbs.

No. 21 Direct Acting Ball Float Trap. Recommended for draining small separators and air line drips. Popular on systems using small, light duty compressors.

No. 213 SW—$29.00 list.
Height 10⅜" Wt. 21 lbs.

No. 213 SW Inverted Bucket Trap. Recommended for draining aftercoolers, intercoolers, and receivers where heavy oil is present. While there is a small air loss from this trap, it is a small price to pay for the *only* trap that will do the job!

Get Them From Local Stock!

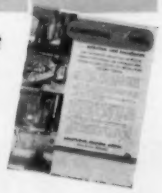
Call your nearby Armstrong Representative or Distributor, or write:

Guide to Air Trap Selection

Type of Trap	No. 71 Snap Action	No. 21 Ball Float	No. 213 SW Inverted Bucket
Handles oil?	Light oil only	Light oil only	Very well
Handles dirt?	Moderate	Moderate	Very well
Air loss?	None	None	Small
Requires priming?	No	No	Yes
Float collapse or leakage?	Remote	Remote	Impossible
Gravity drainage to trap required?	Yes	Yes	No

Bulletin FREE on Request

Now is the time to improve your compressed air moisture removal system. This bulletin tells how — gives complete data and prices of Armstrong Air Traps. Send for your copy today.



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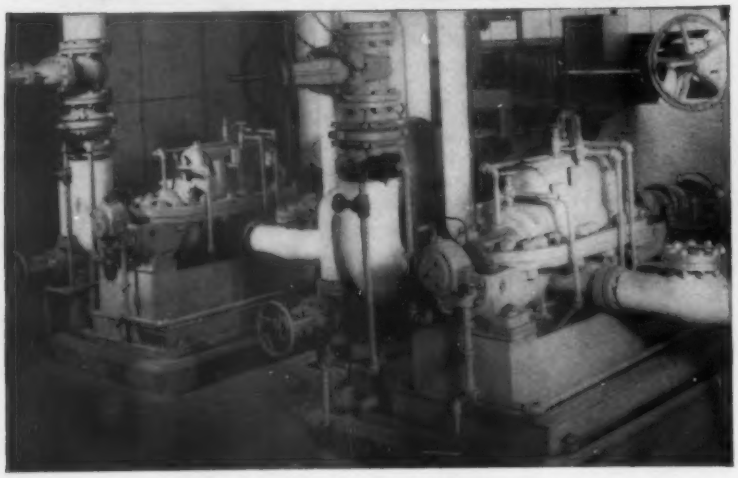
912 Maple Street • Three Rivers, Michigan

Made by the makers of
ARMSTRONG *Inverted Bucket* STEAM TRAPS

For more facts circle 609 on Reply Card

PRODUCTION CONTINUITY

Begins in the Boiler Plant



Warren Six Stage Boiler Feed Pumps installed at a Southern Board and Paper Mill.

Boiler Feed Pumps may look much alike, type for type, but it is well to keep in mind such intangible factors as:

- Experience and integrity of the manufacturer
- Dependability of product
- Know-how, Workmanship, Service
- Maintenance and Repairs
- Lost production due to down-time
- Early replacement because of "tight" original recommendations

It is impossible, of course, to get these items into your "specs," or the supplier into his "quotes," but don't overlook their importance with relation to price, possible future requirements and *production continuity*.

Get your share of "intangibles" . . . specify

WARREN QUIMBY PUMPS

P-34

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC.

Warren, Massachusetts

For more facts circle 610 on Reply Card

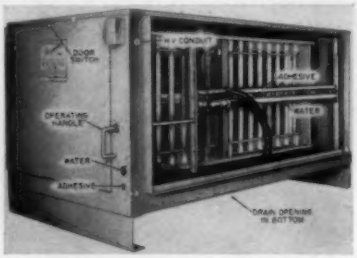
NEW PRODUCTS

(Begins on page 136)

rents for tungsten lamps and motor starting. Other features include quick-make, quick-break action; bolted-type connections. Breakers are supplied in 15-, 20-, 30-, 40- and 50-amp ratings. Catalog 1-150 gives more details. Federal Pacific Electric Co.

43—AIR CLEANER is compact, packaged electronic unit

Requiring a space of only 38 in. in the direction of air flow, the Precipitron Type PC is an electronic air cleaner incorporating movable washing and adhesive applications usually found only in larger units. And it is designed for simplified

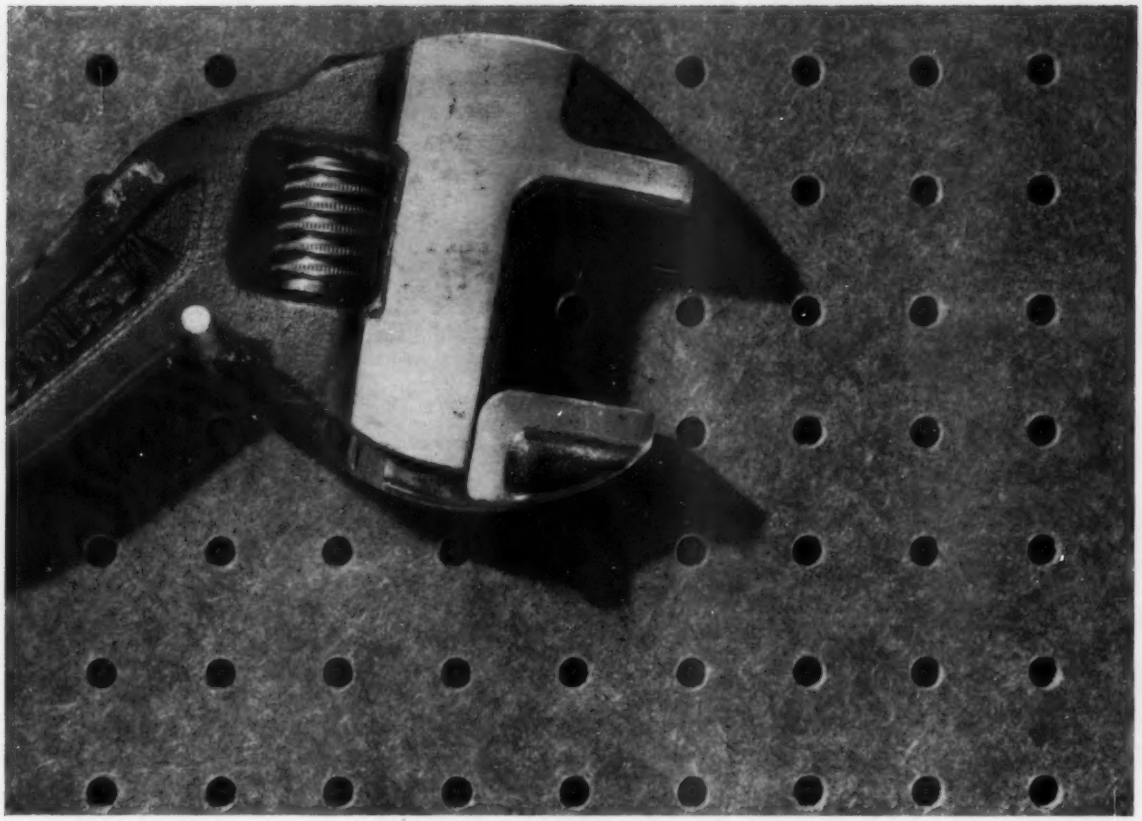


maintenance. Both washing and adhesive application cycles are controlled and operated from outside the unit. The cleaner comes enclosed with built-in drain pan, drain connection, and duct flanges for easy installation. It may be ceiling, floor, or platform mounted.

Designed for removing over 90 per cent of the airborne dirt, the capacities of the models range from 2000 to 10,640 cfm, with the length in direction of air flow the same 38 in. for all. Electrical input required is 115 v, single phase, 60 cycle. Sturtevant Div., Westinghouse Electric Corp.

44—CHAIN BLOCKS, trolleys, for hazardous areas

Lightweight spark resistant and corrosion resistant aluminum chain blocks and trolleys in ¼-, ½-, 1- and 2-ton capacities are announced for hazardous atmospheres or places where safety and resistance to corrosion are of vital importance. A modification of manufacturer's Budgit Aluminum Chain Block, these new models differ only in external working parts. The safety-type load hooks are made from high-strength bronze alloy; load hook sleeves are of a phosphor bronze alloy; load chains, of chrome nickel stainless steel alloy, and, hand chains from a superior bronze alloy. These features tend to eliminate sparking and the generation of static electricity during the raising and lowering of the load, it is noted. The trolleys are designed to support and travel the 'Budgit' Chain Block with full rated load of like capacity. Sparking and static electricity is further reduced through the use of lu-



You get better tool treatment with Masonite Peg-Board panels

Where to use Peg-Board panels

- Tool racks
- Key racks
- "In-and-out" boards
- Portable tool cabinets
- In materials storage racks
- Bulletin boards
- Production scheduling and control boards
- For ventilating paint lockers
- Product displays in offices
- Decorative wall paneling in lobby and offices.

Handiest method ever—for putting tools within handy reach of workers...for orderly department tool storage.

Setting up a system is a cinch with Masonite Peg-Board* panels. More than 60 kinds of metal hangers lock in place to hold tools securely. Lift out with a twist of the wrist when the setup needs changing.

See your local lumber dealer for these time-saving panels. 2′ and 4′ widths; lengths up to 8′. $\frac{1}{8}$″ thick for normal use and $\frac{1}{4}$″ thick for heavy-duty jobs. Send coupon for booklet about uses of other Masonite products.

®Masonite Corporation
*T.M. Reg., U.S. Pat. Off., B. B. Butler Mfg. Co., Inc.

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Please send me your booklet on improving factory methods with Presdwood.

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City..... *State*.....
Zone..... *County*.....

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Even without this famous guarantee

UNCONDITIONAL GUARANTEE
If this Housing ever Breaks or Distorts we will replace it Free.
THE RIDGE TOOL CO.
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would still be the World's Most Popular Pipe Wrench

. . . and no wonder— millions of users know it out-performs, out-lasts all others!

It's the "RIDGID" name that guarantees you everything you want in a pipe wrench—instant bite on the pipe, instant let-go—it can't lock, assured by patented hookjaw suspension . . . handy pipe scale, easy-spin adjusting nut, comfort-grip I-beam handle . . . and every one factory-tested before shipment! Always most for your money. . . your Supply House has them!

You get more quality and more-for-your-money in all RIDGID Pipe Tools.

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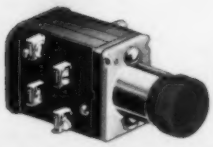
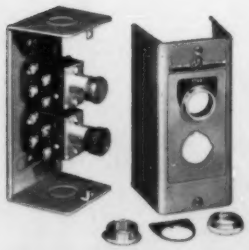
ALLEN-BRADLEY
HEAVY DUTY PUSH BUTTONS



Bulletin 800 heavy duty STOP button ready to mount in enclosure. (See below)



A small stock of standard components lets you assemble any special heavy duty station. There is no waiting for special push button stations.

These new Bulletin 800 heavy duty push buttons are the modernized version of that old reliable line of A-B heavy duty stations. Advantages—until now restricted to the oiltight stations for machine tool use—have been built into these new heavy duty stations—and you'll like the result.

For instance, each button or pilot light is a self-contained unit which can be mounted singly or in groups—vertically or horizontally—in a variety of standard Allen-Bradley enclosures, with the name plate reading in the right direction. Double break, silver alloy contacts used throughout. Send for Bulletin 800.

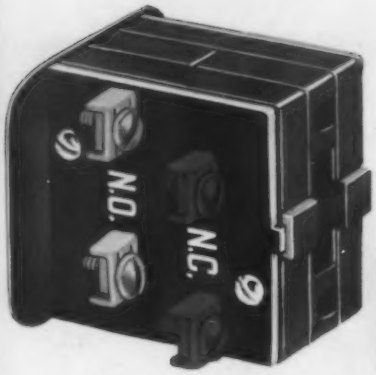
Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wisconsin

In Canada
Allen-Bradley Canada Ltd., Galt, Ont.

A-B Quality

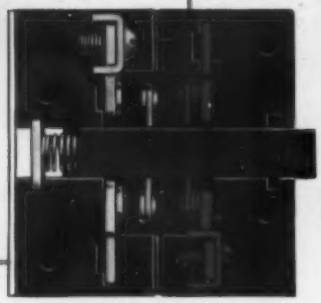
ALLEN-BRADLEY
QUALITY
BULLETIN 800 PUSH BUTTONS

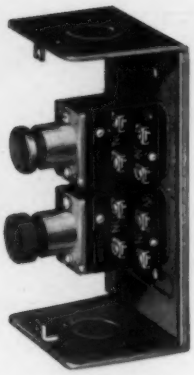
5-56-MR



Left—External view of contact block showing N. O. & N. C. terminals.

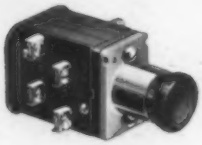
Right—Internal view of contact block showing double break N.O. & N.C. stationary contacts. The pushrod carries the moving contacts.



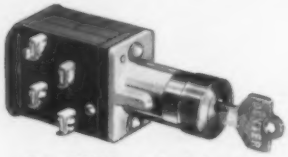


Two button station with name plate and clamping ring removed from cover.

A NEW LINE OF ALLEN-BRADLEY HEAVY DUTY PUSH BUTTONS



Type AK1B flush head START button



Type EK11B cylinder lock unit

Type HK11B wing lever selector switch unit

Type PK16 pilot light with 110 v, 60 cy. transformer. Available with 220-440-550 v, 60 & 25 cy. transformer

Allen-Bradley heavy duty push buttons have been redesigned to take advantage of the type of construction that has made A-B oiltight machine tool stations so popular.

While the new Bulletin 800 heavy duty line is not oiltight, it uses contact blocks that have proved so dependable in the Bulletin 800T oiltight push buttons. Special heavy duty stations can be assembled on the job from a small stock of standard components.

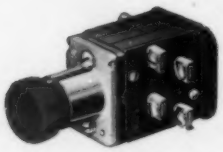
Several types of operators are available, such as standard head, mushroom head, coin slot, key type, wing lever, and 2 or 3 position selector switches. The buttons can be supplied in different colors.

These push button stations can be easily arranged for either vertical or horizontal mounting—with the name plates reading correctly for the desired mounting.

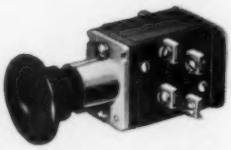
Standard enclosures accommodate up to 8 buttons and pilot lights. Enclosures for more than 8 units can be supplied. Write for Bulletin 800.

Allen-Bradley Co.
1316 S. Second St.
Milwaukee 4, Wis.
In Canada
Allen-Bradley Canada Ltd.
Galt, Ont.

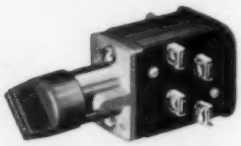
Five button station with pilot light



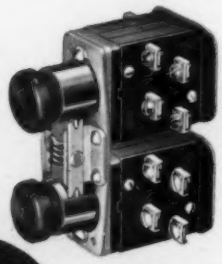
Type BK6B ext. head STOP button



Type DK6B mushroom head button



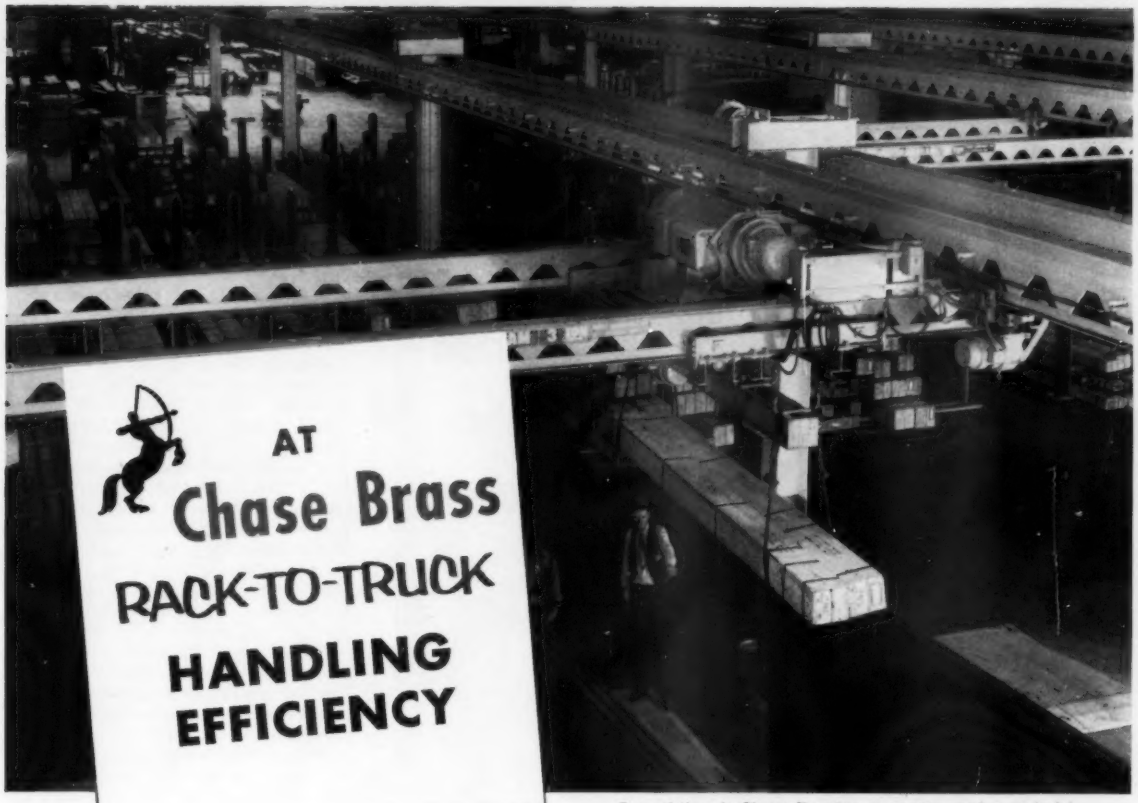
Type HK2B selector switch



Type FK2B 2 button interlocked station

ALLEN-BRADLEY
MOTOR CONTROL

5-56-MR



AT
Chase Brass
RACK-TO-TRUCK
HANDLING
EFFICIENCY

One of the six Chase Trambeam cranes moving material from shipping dock racks to truck. Trambeam keeps aisles free, provides orderly handling and a neat, uncluttered floor.

TRAMBEAM expedites stacking, loading

Six Trambeam Overhead Handling Systems at the Cleveland Mills of the Chase Brass & Copper Co., load twelve trucks simultaneously. Neat dock-side racks are previously stacked with ready-to-ship material by these Trambeam cranes . . . then they load the material as needed onto the trucks. Each crane is push-button controlled and operated by one man, assuring fast, easy handling. Later, should Chase wish to increase shipping speed even more, another crane can be added to each system and both racking and loading can then be done at the same time. Many other Trambeam systems are in operation at the Chase Cleveland Plant and Chicago and Los Angeles Warehouses—all doing specialized handling jobs—proving the versatility, efficiency and economy of the Trambeam method.

Trambeam flexibility can be applied to your operations for fast, low-cost handling. Write for our catalog and the name of your Trambeam distributor . . . his experience in planning overhead handling systems—large or small—will save you money and assure desired results.

WHITING CORPORATION
15675 Lathrop Avenue, Harvey, Illinois

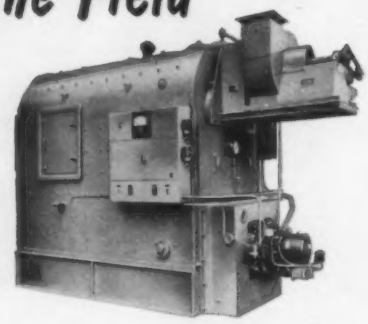
Chase Brass & Copper Co. makes full use of overhead space with versatile Trambeam, here shown moving 2000-lb. coils in plant interior.

WHITING
TRAMBEAM

A view of Trambeam operation at Chase shipping docks from the Trambeam-stacked storage racks.

For more facts circle 614 on Reply Card

Compare International Water Tube Package Boilers *with the Field*



- **Ample Furnace Volume—low heat release rates**
- **Convertible to Coal Firing**
- **Reserve Capacity Always Available**
- **Rapid Directed Water Circulation**
- **Maximum Heat Absorption—quick steaming**
- **Induced Draft—quiet operation**
- **Fully Coordinated—fire tested**
- **Oil, Gas or Combination Firing**

Package boilers can also be shipped, less burner and controls, for installation by local contractors in accordance with International's standard package specifications.

and You Will Specify INTERNATIONAL WATER TUBE HEATING and POWER BOILERS

It will pay you to specify International, the boilers with extra profits built in. We will gladly send these International Bulletins:

No. 600 —Water Tube Package Units
No. 200 & 500—Water Tube Heating Boilers
No. 300 & 400—Water Tube Power Boilers

1886-1956

THE INTERNATIONAL BOILER WORKS CO.

Steel Firebox Heating & Power Boilers Low & High Pressure Water Tube Package Boilers • International-LaMont Forced Recirculation Generators • ASME Code Pressure Vessels & Welded Products.

820 Spruce St. East Stroudsburg, Pa.

For more facts circle 615 on Reply Card

NEW PRODUCTS

(Begins on page 136)

bricated ball bearing beryllium copper trolley wheels having heat treated treads, for long life, and deep side flanges to prevent wheels from climbing the track. Shaw-Box Crane & Hoist Div. of Manning, Maxwell & Moore, Inc.

45—PROPELLER FANS with low noise level operation

Type QD Direct-Connected Axial Flow Fans are designed for large air moving applications requiring low noise level operation. Fans are available in six sizes from 12 through 36 in., with air delivery ratings to 12,000 cfm. A cast aluminum airfoil propeller operating at low speed accounts for quiet operation. Rigid and non-corrosive, propeller will operate continuously without danger of bending, says company, and the thick airfoil design of propeller also eliminates sounding board effect. Also, venturi design of the mounting ring prevents air recirculation at propeller tips, thus reducing noise further. And because propeller is directly connected to motor, belt noise and horsepower loss from pulley friction are claimed to be eliminated. Fans are powered by totally-enclosed, continuous duty, 115/230-v, permanent split capacitor motors. Fans are adapted for two-speed operation as well as variable speed operation with Propellair controllers. Wall shutters and front and rear wire mesh guards are available. Propellair Div., Robbins & Myers, Inc.

To receive product data circle item numbers on the handy Reader Service Cards provided on pages 207-208.

46—WALL PANEL for on-the-job assembly

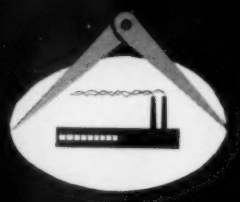
A major advantage of the Type FA Fenestra Panel is that its components can be shipped to the job site where erection and fabrication take place at the same time. According to manufacturer, this method offers even greater economy than previously experienced in light gage metal, curtain wall construction. At the job site, the panel is assembled by welding or bolting a flat plate with Z bar attached to the structural supports. The horizontal channel is secured to the Z bars by sheet metal saddle clips and drive rivets. Batts of fiber glass are forced in snugly between the Z bars and the channels. An asphalt impregnated felt strip is then pasted to the outside of the horizontal sub girt to prevent through metal, thermal conductivity. The exterior fluted sheet is positioned and holes drilled through it and the channel sub girt. Drive rivets are placed and struck, the side joints are vit-clinched and the job is complete.

Only tools necessary for field assembly

Using

DU PONT ELASTOMERS

NEOPRENE-HYPALON®



in Industry

HYPALON® GASKETS STILL SERVICEABLE AFTER TWO YEARS, 2% OZONE EXPOSURE

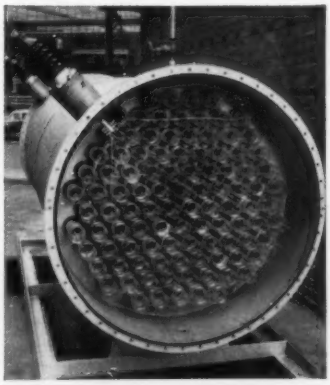
For two years a large chemical firm has used gaskets of HYPALON synthetic rubber in its ozone generators. Despite constant exposure to 2% ozone during that period, not one gasket has shown any sign of ozone cracking.

The ozonator (see below) is a steel shell packed with glass tubes. As dry oxygen passes through the tubes, it is converted to ozone by high-voltage electrical discharge. The ends of the steel shell are closed with dished heads sealed with HYPALON gaskets.

Plastic Gaskets Too Rigid

Formerly, the manufacturer of the generator used plastic gaskets. Though unaffected by ozone, the gaskets took a permanent set under flange pressure and couldn't be reused.

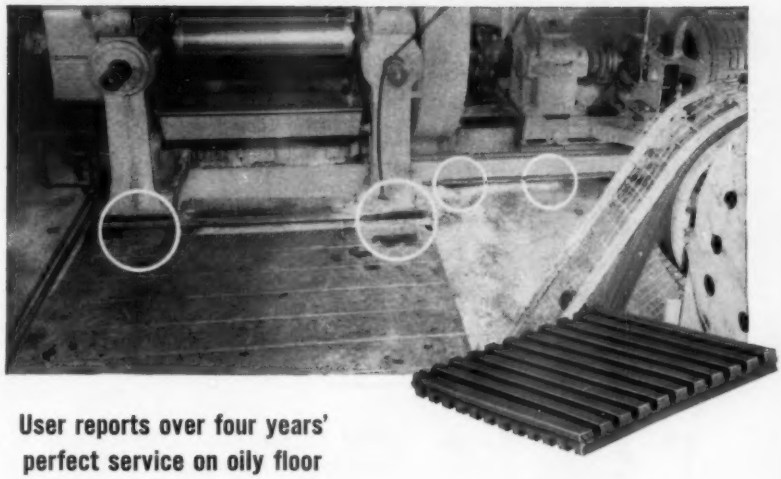
HYPALON has many other advantages. Compared to other kinds of rubber, HYPALON shows unusual resistance to hardening at elevated temperatures (250°-350°F.). It resists strong oxidizing chemicals. Indoors or out, products of HYPALON can cut maintenance costs for you on the really "tough" jobs where severe service conditions exist. Just clip coupon for further information.



HYPALON gaskets are used to seal each end of this ozone generator.

For more facts circle 616 on Reply Card

Neoprene pads support 22,000-lb. mill, reduce noise and cut vibration 75%



User reports over four years' perfect service on oily floor

This rubber mill mixes compounding ingredients into crude rubber. It's a brute-strength operation. The mill weighs 22,000 lbs.; power consumption is high; load changes are almost instantaneous. Normally, the level of noise and vibration is extremely high even though a rubber mill is bolted to a separate concrete foundation pad to reduce vibration.

An answer to this problem of vibration was discovered by the operators of the rubber mill shown above. They constructed a sub-base for it by welding a number of I-beams together and then bolting the mill assembly to the beams. The beams in turn rest on twenty 15-16-in.-thick neoprene pads, which are especially designed to dampen vibration, and which cover a total floor area of only 3.7 square feet.

No floor bolts needed

The resilient neoprene pads support the entire mill and eliminate the need for bolting it to the floor. There is far less noise *and vibration has been reduced 75%*. A precision grinder operating ten feet away maintains close tolerances with the mill in operation.

The simplicity of the mounting saved installation costs because the vibration dampening qualities of neoprene eliminate the need for a concrete pad. As for durability, the neoprene pads have been performing perfectly for 4 years despite constant exposure to grease and oil.

This is just another example of cost savings obtainable through neoprene. Just clip the coupon for further information about neoprene's superior performance.

DU PONT
REG. U. S. PAT. OFF.

HYPALON *is a registered trademark of E. I. du Pont de Nemours & Co. (Inc.)*

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Please send further information and add my name to the mailing list for your free publications, the "Neoprene Notebook" and "Facts about HYPALON®," which show how the Du Pont elastomers are used to cut maintenance and replacement costs, improve production.

E. I. du Pont de Nemours & Co. (Inc.)
Elastomers Division, Dept. PE-5
Wilmington 98, Delaware

Name_____ **Position**_____

Firm_____

Address_____

City_____ **State**_____

SAVES ON EVERY LIFTING JOB

On the roughest, toughest heavy-duty cycle — or ordinary lifting jobs — the Series "700" 'Load Lifter' Electric Hoist gives you the best in load-handling performance and safety. It is a smooth-operating hoist, engineered to lift *fast* at the push of a button. In 2 seconds, a 1-ton load can be lifted a foot! It was the first hoist to have safe 24 volts at the pendant push-button.

Get new speed and cost-cutting power into your load handling with the Series "700" 'Load Lifter' Electric Hoist. Rarely needs maintenance, even under the most adverse operating conditions. Can be serviced *in the air*. Capacities up to 15 tons. Single and two-speed models. All types of suspension. Check with your "Shaw-Box" Distributor for details or write us for Bulletin 410.

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

'Load Lifter' ® ELECTRIC HOISTS

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

For more facts circle 617 on Reply Card

NEW PRODUCTS

(Begins on page 136)

are a molly bolt spreader or a welding rig (depending on the method used to attach the panel to the structural steel), a power drill, a hammer and a riv-clinch tool. This assembly technique produces a panel 24 in. wide and nominally 3¼ in. deep manufactured in lengths to 31 ft. The FA panel is available in 18-gage galvanized steel, and 16-gage aluminum—the latter in either a mill or leatherette finish. Detroit Steel Products Co.

47—MAGNETIC LEVEL sticks to the job all by itself

Having built-in permanent magnets, the Magno-Level stays right on the work, says manufacturer, leaving both hands free. The device is designed to hold securely on ferrous metals at any angle

on either flat or curved surfaces, and its large, polystyrene dial permits at-a-glance reading from any angle. Company says this level is particularly helpful on overhead or cramped quarter work, and that the Alnico permanent magnets used will not weaken on contact with metal—will hold in position indefinitely. Made of aluminum, the Magno-Level weighs only 10 oz, is 9 in. long, and costs about $10.00. It is suggested for use in plumbing, steam-fitting, sheet metal work, carpentry. Richards Merchandising, Inc.

48—LAMP GUARDS permit easy bulb replacement

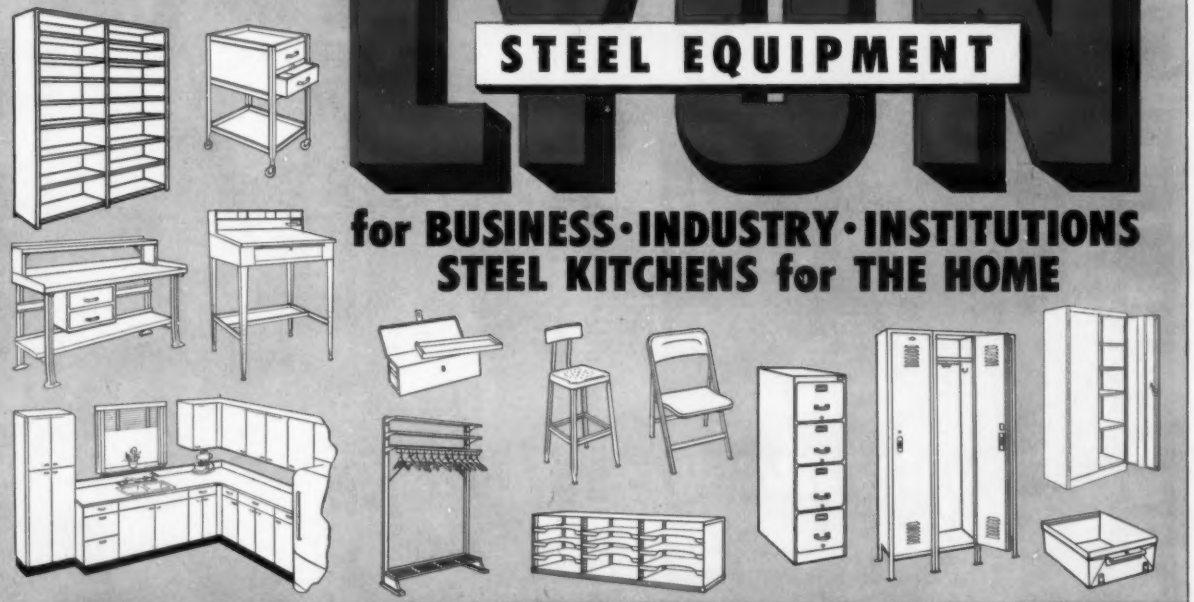
Models 5100 and 5100G Lamp Guards are designed to answer the need for a quick-opening cage to permit fast replacement of burnt-out bulbs. These guards have a holding clamp that is disengaged by thumb pressure, letting the cage swing wide open. No tools are required. The guards have molded-phenolic handles, described as impact and heat resistant, insulated and non-conductive. Their phenolic construction also provides resistance to oils, greases, some acids, moisture, abrasion and breakage. A convenience outlet is molded as part of the handle to permit use of portable power tools.

The Model 5100 is offered for use in two-wire circuits; and the 5100-G for use in three-wire grounded circuits. In the three-wire circuits, the cage is grounded by means of the internal handle construction which has a third terminal providing contact with the attached cord. Both models are available in two sizes: medium for bulbs to 50 w and large for bulbs from 60 to 100 w. In addition, they

Ask your LYON Dealer for

LYON®

STEEL EQUIPMENT



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STEEL KITCHENS for THE HOME

A PARTIAL LIST OF LYON STANDARD PRODUCTS

• Shelving	• Kitchen Cabinets	• Tool Toters	• Chests and Safes	• Flat Drawer Files	• Folding Chairs	• Service Carts	• Tool Stands
• Lockers	• Cabinet Benches	• Bar Racks	• Display Equipment	• Revolving Bins	• Coat Racks	• Sorting Files	• Shop Boxes
• Stools	• Storage Cabinets	• Tool Boxes	• Toolroom Equipment	• Filing Cabinets	• Work Benches	• Drawer Units	• Tool Trays
• Bin Units	• Drawing Tables	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks

Lyon also has complete facilities for manufacturing special items to your specifications

LYON METAL PRODUCTS, INC.
General Offices: 591 Monroe Ave., Aurora, Ill.
Factories in Aurora, Ill. and York, Pa.
Dealers and Branches in All Principal Cities

For more facts circle 618 on Reply Card

DAY REVERSE JET DUST FILTERS

HAVE EARNED INDUSTRY'S ACCEPTANCE

Introduced in 1949, the rapid sales growth of DAY "AC" dust filters measures industry's approval of this totally different dust filter. Bar graph (drawn to scale) shows how sales of DAY "AC" filters have increased during the past seven years.
1949
1950
1951
1952
1953
1954
1955

HERE'S WHY DAY Reverse Jet Dust Filters HAVE EARNED ACCEPTANCE!

Utilizing the Hersey principle of reverse air cleaning, DAY "AC" dust filters brought industry a needed, long overdue, improved dust filter. This filter has many benefits never before found in any dust filter equipment.

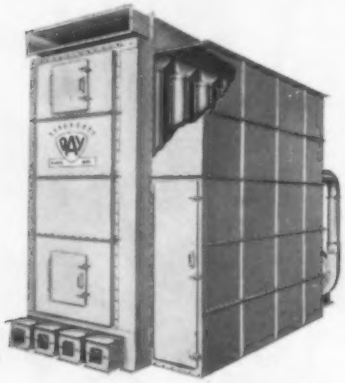
● NEW HIGH EFFICIENCY PERFORMANCE—This filter provides efficiencies measured as high as 99.99+%. This assures cleaner air and higher product recovery.

● NEW FILTER MEDIA—DAY *felted* filter media traps more dust than woven fabric. Felt gives higher efficiency, longer life and has same pressure drop as woven fabric.

● NEW DESIGN FEATURES—The Hersey principle of reverse jet cleaning, DAY self-adjusting blow rings, sanitary square-to-round air inlets, automatic-continuous operation, superior filter media, are just a few of the features introduced by DAY.

● NEW FILTER TUBE CLEANING—Patented self-adjusting blow rings clean the entire filter tube automatically and continuously, to give DAY filters an air handling capacity 5 times higher than ordinary filters.

● NEW LOW INSTALLATION COSTS—Unit sub-assembly saves time and money—up to 75% on filter erection costs.



Licensed by H. J. Hersey, Jr.

The DAY "AC" Reverse Jet Dust Filter is the largest selling filter of its type in the world!

Place the successful operation of your dust control system in our hands. Experienced DAY Application Engineers will survey your plant and supply you with engineered recommendations. With DAY there is no divided responsibility. Our guarantee of satisfaction is backed by 75 years of experience.

Bulletin 559 gives important facts and complete description of the DAY "AC" dust filter. Write toDAY for your copy of this informative 24-page bulletin.

75 YEARS DAY SERVING INDUSTRY SINCE 1881

The **DAY** *Company*

807 Third Avenue N. E., Minneapolis 13, Minnesota
IN CANADA: P. O. Box 70G, Fort William, Ontario
Branch Plants: Buffalo, Fort Worth and Toronto, Ontario
Representatives in Principal Cities

For more facts circle 619 on Reply Card

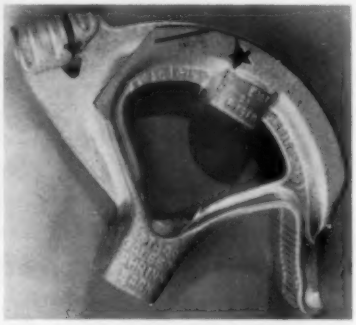
NEW PRODUCTS

(Begins on page 136)

can be furnished with a standard heavy-wire open cage; with a reflectorized cage; with a Levolier on-off switch; or with reflectorized cage and Levolier switch. McGill Mfg. Co., Inc.

49—BENDING TOOL for rigid conduit, tubing

The NE Benfield Redege Bender is announced as the first universal portable hand bender which can be used for both rigid conduit and thin wall tubing. Made of pearlitic iron, the bender is finished



in aluminum paint with bright red edging and markings. A compact and easily portable tool, it is available in three sizes: Catalog No. 1050, which is used for ½-in. EMT and weighs 2¼ lb; Catalog No. 1075 for bending ½-in. Sherarduct and ¾-in. EMT weighs 4.4 lb; and Catalog No. 1100 which bends ¾-in. Sherarduct and 1-in. EMT, and weighs 8¼ lb.

Special features of the benders are claimed to assure true alignment and accuracy in stubs, offsets, and rolling offsets. The Redege is designed as its own measuring unit, eliminating the need of pencil measurements. The length of the tool equals its own take-up. A peek hole is provided in the hook for left handed electricians. National Electric Products Corp.

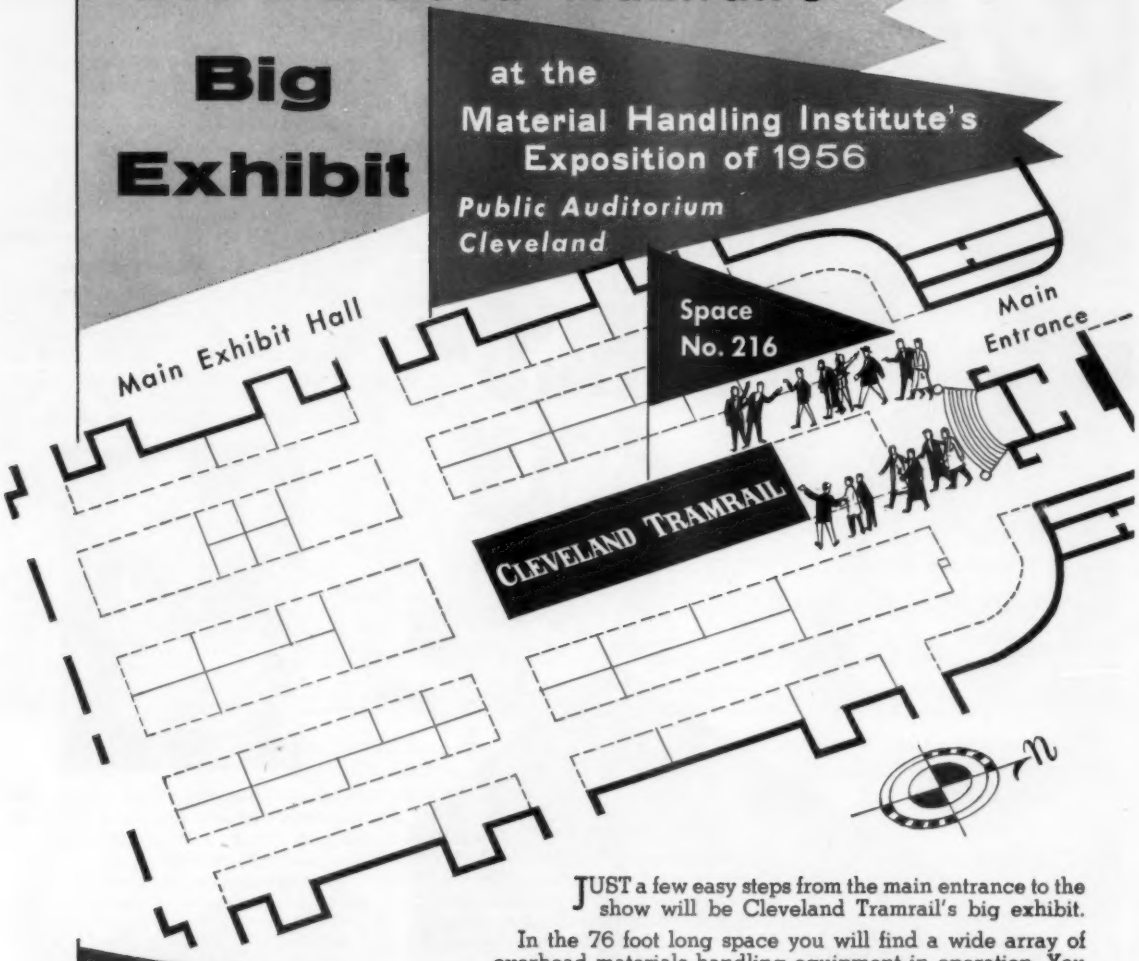
50—POTENTIOMETER-RECORDER is self-contained

The Series 8000 Electronic Potentiometer-Recorder, of the null-balancing type, is self-contained and requires only an external sensing device. It has been designed to provide maximum accuracy, simple operation, and minimum maintenance, and is available in a wide range of models which measure, indicate, control and give a permanent record of such variables as temperature, speed, strain, hydrogen ion (pH) and others that can be resolved into electrical signals.

Applications for the unit include measurement and control of temperatures in the pyrometric range; as a resistance thermometer-type of system; measurement of speed; as radiation receiver; and for any function which can be resolved to a d-c signal load and the measure-

See Cleveland Tramrail's Big Exhibit

at the
Material Handling Institute's
Exposition of 1956
Public Auditorium
Cleveland



JUST a few easy steps from the main entrance to the show will be Cleveland Tramrail's big exhibit.

In the 76 foot long space you will find a wide array of overhead materials handling equipment in operation. You will be able to see and study first hand what makes Cleveland Tramrail equipment so outstanding that over 9,000 plants in the United States and Canada have more than 40,000 installations of it for lightening the work and speeding production.

You will see important new items and improvements:

New Manually-Operated Switch

Heavy slide rod construction enables smoother operation. More positive lock mechanism. Wearing parts including track sections easily replaced.

New Switch Motorization

Rugged, simplified construction assures trouble-free track switch operation.

New Tractor

Powerful unit with greater wheel traction. Heavier gearing, more easily reached, requiring removal of only one gear cover.

New "Power and Free" Attachment

New tractor attachment releases drive wheels from track. Permits easy tractor movement during manual propulsion. Valuable for many automatic handling systems.

New Roll Grab

Hydraulic operation. Smoother running. More positive grip. Fewer moving parts, easier to reach. Handles rolls in vertical or horizontal position and turns from one to the other. Grab on exhibit handles rolls to 6000 lbs., from 24 to 60 inch diameter, from 36 to 84 inch long.

Cleveland Tramrail Division
The Cleveland Crane & Engineering Co.
Wickliffe, Ohio

CLEVELAND TRAMRAIL

For more facts circle 620 on Reply Card

Clean ...Motors and Generators... Quickly, Efficiently, Safely with TURCO-SOLV

- **Far More Efficient** than stoddard solvent
- **Far Less Toxic** than carbon tetrachloride
- **Far Safer** than gasoline

Also ideal for a host of other plant maintenance cleaning jobs

Since the introduction of Turco-Solv three years ago, hundreds of industrial concerns have purchased and used this material for electrical equipment and plant maintenance cleaning. A true detergent action safety solvent, only Turco-Solv offers you an unchallenged combination of user benefits... safety, efficiency, speed and versatility.

It is from a continuous program of laboratory research, testing and development that comes the constant improvement of existing Turco materials, and the certainty that Turco will develop new products, as they are needed, through the tomorrows that lie ahead.

TURCO

TURCO PRODUCTS, INC.
Chemical Processing Compounds
6135 So. Central Ave., Los Angeles 1, Calif.
Factories: Newark, Chicago, Houston, Los Angeles
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Write for Booklet "The Story of Safety Solvents"
FREE!
Valuable booklet discusses all methods of cleaning electrical equipment and gives advantages of each.

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6135 So. Central Ave., Los Angeles 1, Calif.
Please send me a copy of "The Story of Safety Solvents" without cost or obligation.

NAME_____

TITLE_____

PE

For more facts circle 621 on Reply Card

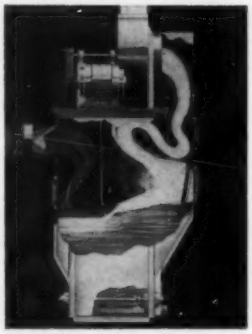
NEW PRODUCTS

(Begins on page 136)

ment of pressure through use of a strain gage. Accessibility and easy adjustment is provided by outer door that swings open 180 deg. Both the chart rolls and chart and recorder drive assembly swing out 180 deg. the opposite way. Instrument is available in standard scale ranges which can be changed without soldering or need to change slidewire. Wheelco Instruments Div., Barber-Colman Co.

51—DUST COLLECTOR permits efficient dust transfer

The Ventrijet Wet Dust Collector is said to achieve proper atomizing of water and mixing with air stream to permit efficient dust transfer by movement of air without mechanical means. Dust laden air enters Ventrijet collector and expands in the inlet chamber at reduced



velocity. Heavier particles sink to the bottom of tank as sludge and air is drawn through one or more venturi tubes into the discharge chamber.

Low pressure area in the venturi throat induces water also to enter the high velocity stream. Mixing of air and water causes transfer of dust particles from the air to the water particles. The air, water and sludge mixture impinges at high velocity on special surfaces in the discharge chamber, sludge settles to bottom of tank, and washed air then flows through an eliminator section for removal of droplets and clean air is discharged. Unit comes in capacities from about 1,000 to 30,000 cfm in single and double row tube types. Pangborn Corp.

52—ELECTRICAL TAPE for high voltage splicing

Scotch Brand No. 23 is a self bonding electrical tape for making high voltage splices. Possessing high dielectric strength (650 v per mil), the new tape is reported to provide excellent ozone resistance and is intended for use as primary insulation on splices on insulated cables using ozone resisting compounds. After application, the tape fuses into a homogeneous mass to yield maximum moisture resistance. It is recommended that the ¾ in. tape be necked down to ½ in. when wrapping to provide a good

Thompson's Aluminum Vinyl Paint rated best of 25 coating systems in six-year underwater endurance test

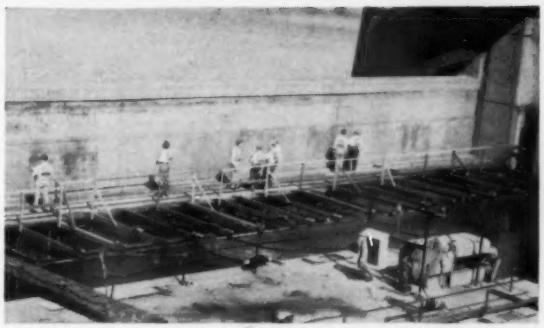
Thompson vinyl-aluminum coating system, manufactured by Thompson & Company, Oakmont, Pa., and pigmented with ALCOA® Aluminum, has been reported* best of twenty-five systems in a continuing underwater test conducted by the Pittsburgh District U. S. Army Corps of Engineers. Second, third and fourth places also went to aluminum-pigmented coatings. Other paint systems in the test included eight vinyls, fourteen phenolic varnish-pigment paints and three rubber base and coal tar coatings.

The tests began in September, 1949, when the twenty-five coating systems were applied to sections on the upstream side of the lift gate on the Emsworth Dam. Each large section was sandblasted prior to coating. The paints were allowed to dry for five days before submersion approximately one foot below the river surface.

Impartial industry and Army engineer representatives judged the systems according to rusting, blistering, top coats and primers. The Thompson Vinsynite-Vinyl system consisted of a primer coat of FS-2 Vinsynite followed by three coats of Thompson aluminum-pigmented Vinyl Paint.

Alcoa does not make paint, but leading paint manufacturers, like Thompson & Company, use ALCOA Aluminum Pigments in their aluminum paints. There's an ALCOA Aluminum pigmented paint to solve your paint problems. Write today for more information on *Painting With Aluminum.* You'll also want the new booklet, *Aluminum Asphalt Roof Coatings Make Time Stand Still.* They're FREE. ALUMINUM COMPANY OF AMERICA, PAINT SERVICE BUREAU, 1790-E Alcoa Building, Pittsburgh 19, Pennsylvania.

*Paint, Oil and Chemical Review, October 6, 1955.



Judges inspect steel-plate lift gate of Emsworth Dam, Ohio River, near Pittsburgh, for signs of corrosion after six year test of 25 paint systems.

PIGMENTED WITH
ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA
*ALCOA

THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS

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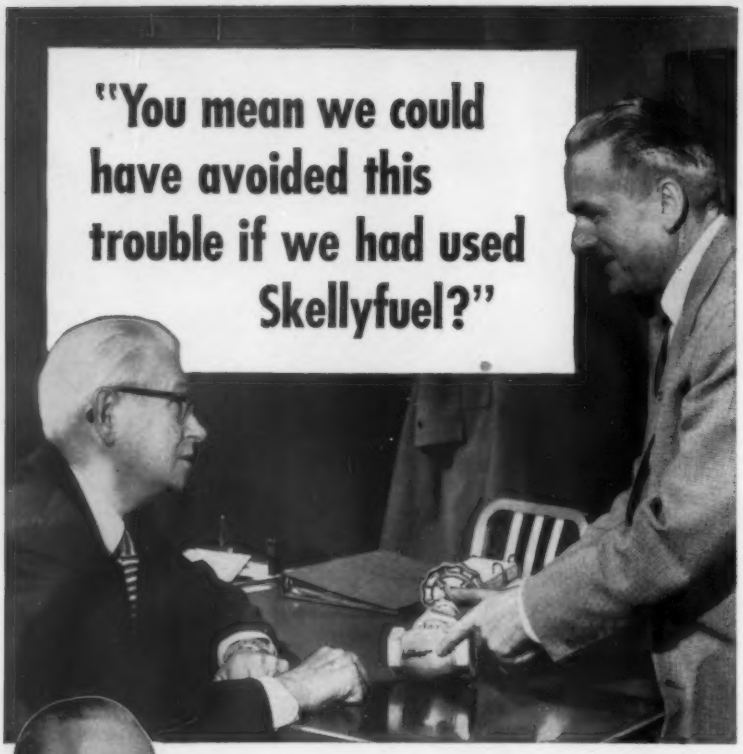


"How a $5,000 shutdown convinced me that all L-P Gases are not alike!"

"Frankly we had been using another well-known brand of LP-Gas. Since all LP fuels have to meet NGAA specifications, we thought one was as good as another.

"But we found out otherwise the day our LP-Gas System became inoperative. We figured the shutdown would cost us $5,000 a day, and we needed expert help in a hurry.

"Even though we were not using Skellyfuel, we knew their technical experience and 'know-how' to be the best in the business. So we put in a rush call to Skelly Oil Company. One of their technical men arrived within hours.

"It didn't take him long to discover that our trouble was caused by moisture in the fuel tanks which froze and ruptured a valve. So we cleaned out the tanks and refilled them with Skellyfuel. We haven't had any trouble since. Knowing what I do now, I don't see how any plant can take chances on anything less than Skellyfuel."

Skellyfuel is moisture-free and gives cleaner heat and closer temperature control. And no wonder. Skellyfuel has pioneered in industrial LP-Gas research and *quality control* for over 25 years.

Phone today or write for the free 20-page Skellyfuel booklet. Then you, too, can learn the story of Skellyfuel's high quality, dependable service and superior installations!

SKELLY

Skellyfuel

SKELLY OIL COMPANY
Industrial Division
605 West 47th Street
Kansas City 41, Missouri

For more facts circle 623 on Reply Card

NEW PRODUCTS

(Begins on page 136)

moisture seal and squeeze out air pockets.

A 900 per cent elongation factor makes the tape's conformability excellent, even at cold temperatures, says company. Short fusing time is another advantage announced—after it has been applied for as little as 5 min. it cannot be removed without rupture. Also, No. 23 is said to have no corrosive effect on copper or silver. This tape is described workable, elastic but tough, clean to apply. Its yellow liner strips from the black tape during application. No. 23 is compatible with overwrap tapes used to provide extra physical protection to the splice. Minnesota Mining and Mfg. Co.

Use the Reader Service Cards provided on pages 207-208 to ask for more information on these products. Circle item numbers of products in which you are interested.

53—HAND HOISTS in capacities to 12 tons

Extension of this company's lightweight Load King Hand Hoists to include capacities of 3, 4, 5, 6, 8, 10 and 12 tons is announced. According to manufacturer, this hoist line has approximately 40 per cent fewer working parts and 60 per cent less weight, and in the new, higher capacity models this weight reduction becomes even greater. Another advantage claimed for these hoists is the reduction in headroom over other similar capacity hoists. The hoists are built with efficiencies up to 95 per cent through the use of precision machined parts and utilization of ball bearings on all rotating shafts, it is pointed out, and this means less pulling effort and operator fatigue, as well as faster hoisting. Company states that load safety is built into the new hoists in the Synchromatic Load Brake, which provides a maximum of brake diameter and overall area for a given hoist capacity. The hoists utilize a steel, drop forged safety hook designed to open slowly—without fracture—under excessive overload. The Yale & Towne Mfg. Co.

54—ISOLATED PHASE BUS is strong, lightweight

New advantages for safely conducting large concentrations of power are announced for this isolated phase bus design. An all-welded, aluminum basic assembly, factory fabricated and shipped in one piece, it combines strength, light weight and structural simplicity. Normal mounting conditions permit use of two supporting rings for each basic assembly, to give rigidity and quick alignment. Easy opening for inspection is gained from a telescope-type two-way sliding cover with V-camp closure, which requires but

JalKlamp splices

have full rope strength

Now you can cut wire rope sling costs and still get stronger, safer slings with JalKlamps, the new special alloy sleeves for wire rope splicing.

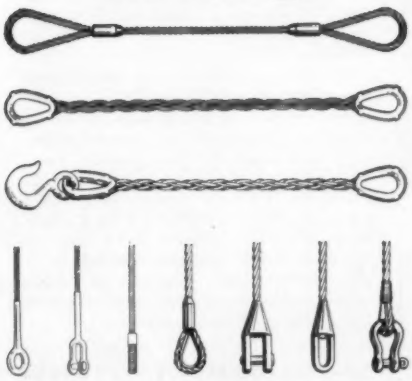
When hydraulically pressed around the rope, the JalKlamp's non-corrosive alloy actually flows into every space between the wires and between the strands of the rope. Result: a neat, permanent, watertight splice that develops the full strength of the rope.

JalKlamp slings and terminals are available in all standard wire rope constructions with diameters from 1/8" to 2". They're part of a full line of JalFlex Slings and Fittings including all types of braided slings and swaged fittings that can meet your individual wire rope assembly requirements.

Write for complete information on the JalFlex Slings and Fittings today.

Designs for Every Need

JalFlex Slings and Fittings



Jones & Laughlin

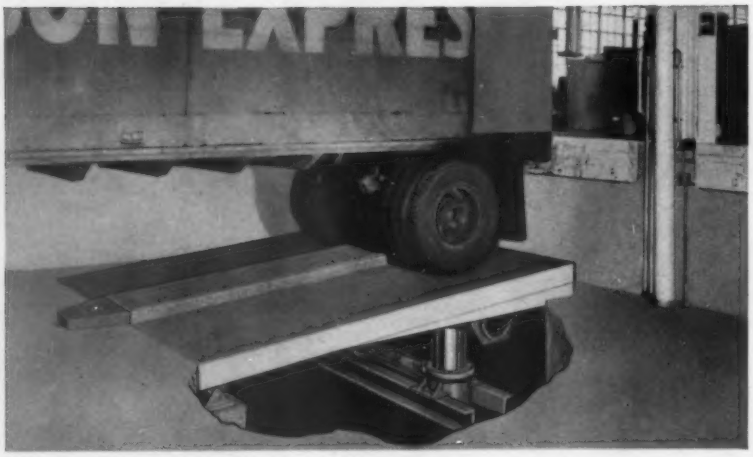
STEEL CORPORATION · PITTSBURGH

J&L STEEL

For more facts circle 624 on Reply Card

Loading needs automation, too!

HOW TO SLASH TIME AND LABOR WITH HYDRAULIC DOCK EQUIPMENT



ROTARY TRUCK LEVELER raises or lowers truck to dock height

The Rotary Truck Leveler handles any highway carrier at any loading dock. Easily installed in pavement in front of dock at new or existing buildings, it takes no space and does not obstruct dock traffic. Hydraulic jacks raise or lower trailer to dock level, eliminating sharp, dangerous inclines and permitting fastest loading and unloading with any type of materials handling equipment. Capacity, 40,000 lbs. Travel, 28". Dependable, economical operation by Rotary Oildraulic electric power unit.

ROTARY LEVA-DOCK® RAMP
Automatic self-leveling ramp

Recessed into the loading dock, this hinged ramp moves up or down automatically to provide an even, safe runway for truck loading equipment. The Rotary Leva-Dock Ramp speeds loading and reduces breakage. Economical hydraulic operation. Rugged steel torque frame. Inexpensively installed at new or existing docks.

Rotary also makes vertical platform lifts with capacities to 100,000 lbs.

Rotary®
OILDRAULIC® LIFTS

Manufactured by
ROTARY LIFT CO., MEMPHIS, TENN.
Specialists in oil-hydraulic lifting devices

Mail Coupon for Complete Data
Rotary Lift Co.
1152 Kentucky, Memphis 2, Tenn.

Send information on ☐ Truck Leveler; ☐ Leva-Dock Ramp; ☐ Platform Lifts.

Name_____

Address_____

For more facts circle 625 on Reply Card

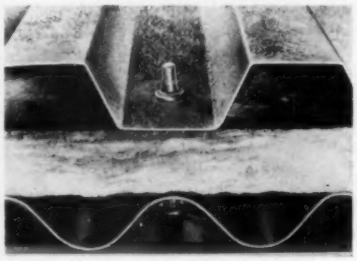
NEW PRODUCTS

(Begins on page 136)

one, single-piece, 0-ring gasket in each cover joint. Completed structures have smooth inside surfaces, offering no pockets to collect moisture. Bulletins 10004-A and 10004-B give further details on this. I-T-E Circuit Breaker Co.

55—FASTENING SYSTEM for curtain wall use

The Setlok is a stud welded construction fastener with aluminum cap which permits faster field-assembly and improves appearance of insulated metal sandwich and other curtain walls. The new fastening system employs a steel shoulder type stud with serrated tip which is end welded to structural girts with the Nelson stud welding gun. In sandwich-type construction, the inner skin—corrugated aluminum, flat sheet or formed pan—is impaled over stainless steel, cadmium plated or mild steel studs and speed clips

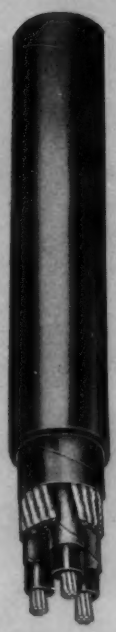


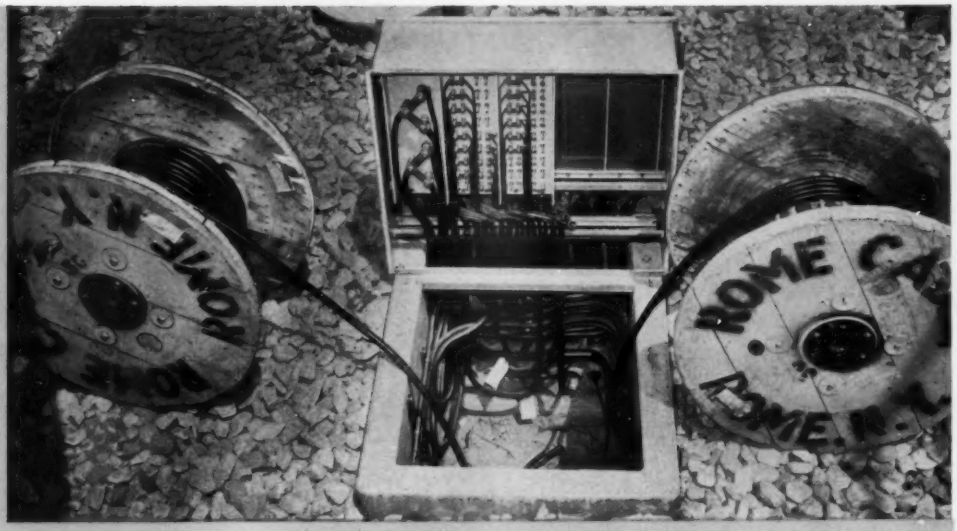
applied to hold the inner material firmly in place. Fiberglas insulation is then impaled over the studs and the exterior material impaled with a hard rubber hammer, so that the sheet rests against the shoulder of the stud. The aluminum Setlok cap is then placed over the serrated tip of the stud and driven into position with a tool which causes the aluminum to flow into and to grip the serrations. Tests are reported to show that this fastener, when in place, has a holding power of 800 lb. on a direct pull.

Rust and galvanic action are claimed prevented by use of the granular flux-filled studs and aluminum caps. There is no occasion for drilling structural members, for the use of tees or channel spacers, and all of the work is handled from one side. The same fastener is declared equally effective when used with a single sheet of metal roofing or siding material and in insulated structures with mat-faced Fiberglas insulation on interior and metal only on outside. Nelson Stud Welding Div., Gregory Industries, Inc.

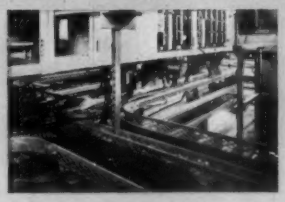
56—INSTRUMENT TRANSFORMER for indoor service

The JCS-O is a 600-v window-type butyl-molded instrument transformer for switchboard and switchgear applications designed for indoor service. It is available in standard ASA current ratings from 200:5 to 4000:5 amp. Frequency is





Install RoMarine-RoPrene underground in ducts—in panels, indoors or outdoors



Where you install cable in racks, trays or metal raceways, specify RoMarine-RoPrene. Its light weight and smaller diameters will make your job easier.

To light the Ft. Worth International Airport, 55 miles of CAA approved RoMarine-RoPrene single-conductor cable (rated at 3000 volts) was buried directly in earth.

One all-purpose cable for all these applications!

If you are one who has anything to do with the distribution of low-voltage power—underground, aerially, in ducts or in circuits combining all three—this is for you!

RoMarine-RoPrene is an all-purpose nonmetallic sheath power cable you can use for a variety of industrial power distribution jobs.

This product of Rome research and engineering has proved its superiority in so many ways you can bank on it without reservation.

RoMarine is a high-quality heat and moisture-resistant insulation (RH-RW) exhibiting exceptional electrical stability after long-time immersion in water together with excellent long-life aging characteristics. RoMarine conforms to all requirements of ASTM Specifications D754-54T, plus additional moisture absorption tests as specified by Underwriters and IPCEA Appendix N.

RoPrene is a tough, impervious Neoprene sheath fitting tightly to the insulation and possessing a high degree of resistance to oxidation, heat, flame, weather, oil and most chemicals. RoPrene conforms in all respects to ASTM Specification D752 and Grade I of IPCEA Appendix K.

RoMarine-RoPrene is available in two distinct types with respect to application and operation, namely, Style RR and Style RR-D.

RoMarine-RoPrene approvals

RoMarine-RoPrene, Style RR.

This is Rome Cable's standard product, manufactured with sheath thicknesses suitable for *direct earth burial*, and is equally suitable for use in conduit or duct, as well as aerial installation where greater protection against cable rings or binding wires is desired. It is Underwriters' approved as Type USE for underground service entrances and is so labelled and surface marked.

RoMarine-RoPrene, Style RR-D.

This type construction is offered for use in ducts or underground conduits as an economical power cable manufactured with the same high-quality insulation, but with lighter sheath thicknesses. While approved by Underwriters' Laboratories Inc. and identified as Type RW (60°C.)—Type RH (75° C.), this construction *is not recommended for direct earth burial.*

CAA Specification L-824

RoMarine-RoPrene, Style RR is approved by the Civil Aeronautics Administration for airport wiring when CAA Specification L-824, with Type A insulation applies.

For more detailed specifications, write for Bulletin RR-2.

It Costs Less to Buy the Best

ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

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Ask these questions, too, when you judge a fluorescent lamp...

Are its electrodes built for longest lamp life?

Constant development of new and better ways to make fluorescent lamp electrodes has enabled Westinghouse to *triple* the life of its fluorescent lamps since 1948.

Is it easy to seat securely?

Westinghouse fluorescent lamps are built with "guide bumps" on the end-caps. Easily felt with the fingers during lamp installation, they tell at a touch when the lamp has been securely seated in its sockets.

Is it the correct type, size and color for the lighting job to be done?

In the Westinghouse fluorescent family of 290 different lamps—including Slimline and Rapid Start—there's a type and size precisely right for every office, plant and merchandising application. Colors include seven different shades of "white" alone.

For the full story on how to get more for your money in fluorescent light, contact your Westinghouse Lamp Representative. "You can be sure if it's Westinghouse."

WATCH WESTINGHOUSE

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU***

For more facts circle 627 on Reply Card

NEW PRODUCTS

(Begins on page 136)

50/60 cycles and thermal rating is 100 per cent of rated current with 55C ambient and 133 per cent of rated current with 30 C ambient. Two window diameters are provided: 4½ in. for the 200:5 to 600:5 amp ratings and 5⅜ in. for the 800:5 to 4000:5 amp ratings. The molded butyl serves as both insulation and case, achieving the light weight of 28 lb. The unit is said to be lighter, more accurate, more rugged, and less expensive than its predecessor company's JS-2. General Electric Co.

57—SIPHONING PUMP for easy transfer of liquids

The Emson Siph-O-Pump is announced as a handy, low cost, alkali- and acid-proof pump for pouring acids and other liquids without lifting or tilting the container. Besides obvious safety advantages, the unit is said to permit greater control

and accuracy in the dispensing of liquids in that it has a triple action—it pumps, it stops, and it siphons back in the event of over-filling. It consists of a rubber bulb pumping assembly, a telescoping lifting tube to permit draining of deep containers, and a pouring spout. By lightly pressing and releasing the bulb, pumping action begins at the rate of 1½ gpm. This flow rate can be checked by pressing a stop valve button. Siphoning action is started by lightly squeezing the bulb and then pressing the stop button.

The Siph-O-Pump is claimed virtually unbreakable and long lasting with normal usage. Liquids contact only the plastic tubes, not the rubber bulb; and for use with solvents, the plastic tubing can be replaced with either metal or glass tubing. E. Machlett & Son.

58—VARIABLE SPEED DRIVE has wide speed range

Selectron Variable Speed Drives are reported to offer a wide speed range compactness, load compensating circuit for close speed regulation, simple installation, stepless control, fast speed response, easy maintenance and optional features which make them adaptable to a wide range of equipment. Normal speed range is 22 to 1, but speed ranges as great as 60 to 1 are available. With tachometer feedback, speed can be controlled to within ¼ of 1 per cent. Standard optional features include dynamic braking, reversing and inching control. Power supply is from a-c, in single phase voltages of 110, 208, 220, 440, or 550 at 50 or 60 cycles. Separate transformers for other voltages are available. Drive motors are of the heavy duty, ball bearing industrial type in standard NEMA frames. Electro Dynamic Div., General Dynamics Corp.

59—LIGHTING UNIT provides ideal light for color work

Color Matcher Fluorescent Lighting Unit provides the equivalent of natural light entering a North skylight at high noon, it is announced—ideal illumination for precision color tasks. According to company engineers, it provides light of the best Kelvin temperature (7500 deg) for exacting comparison of colors. It uses a mixture of six 40-w fluorescent lamps comprised of four Super Delux 45 and two standard blue in a Plexiglas and steel fixture. Resulting light covers full spectrum range. In addition to its uniform and accurate color rendition throughout the spectrum, it also produces strong illumination at working levels—over 75 foot-candles—for optimum visibility. Duro-Test Corp.

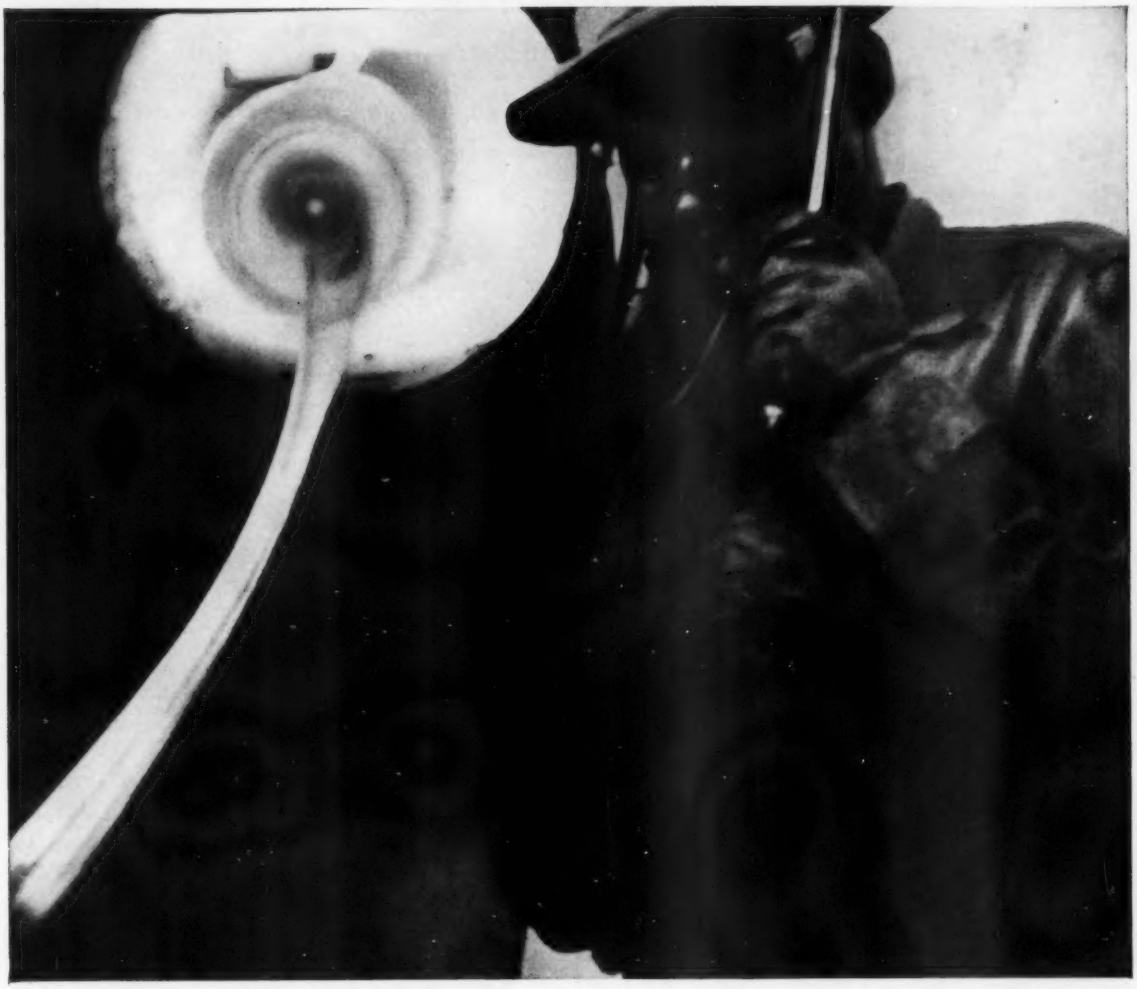
60—FLANGED CONNECTOR absorbs piping stresses

This flexible, flanged connector is designed to provide a non-rigid take-off from engines, machines, and equipment. It is supplied with a conventional flange on one end; the other end has a rubber packed compression seal which absorbs vibration, expansion-contraction stresses and compensates for small misalignments or deflection in the connecting pipe or tubing. This is declared of particular advantage where movement stresses may be encountered in service. The flange connectors can also be furnished with insulating gaskets which prevent stray electrical currents from going on the piping. Suitable for gas, oil, water, air, gasoline, brine, and many chemical applications, these flanged connectors may be used where temperatures of material carried do not exceed 215 F. They come in pipe sizes to 2 in. ID. Dresser Mfg. Div.

61—SPRAY ENAMEL for two-color application

Zatex is a spray enamel developed to permit application of two or more colors simultaneously from a single spray gun. It is applied with standard spray equipment and techniques. It comes in a wide range of color combinations and, according to manufacturer, the decorative finish offers excellent coverage over surface irregularities, a high degree of mar resistance, and extreme washability. The multi-colored coating adheres to metal, wood, plywood, ceramics, stucco, plaster, wallboard, brick and building block, it is stated, and due to chemical suspension, the various colors remain separated

how to judge a fluorescent lamp ... point no. 3



ask about **TAILORED GLASS**

Quality of glass in a fluorescent lamp directly affects lamp performance. For example: if the "surface condition" of the glass is not exactly right, the lamp's light-producing phosphor coating will not stick securely to the inside of the tube, and bare spots will develop. To make *sure* of proper surface condition—as well as high strength, good clarity, precise dimensions and other essential properties—Westinghouse makes all of its own fluorescent lamp glass, tailoring it from silica to finished tubing specifically for fluorescent service. "You can be sure if it's Westinghouse."

WATCH WESTINGHOUSE

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU***

For more facts circle 628 on Reply Card

NEW PRODUCTS

(Begins on page 136)

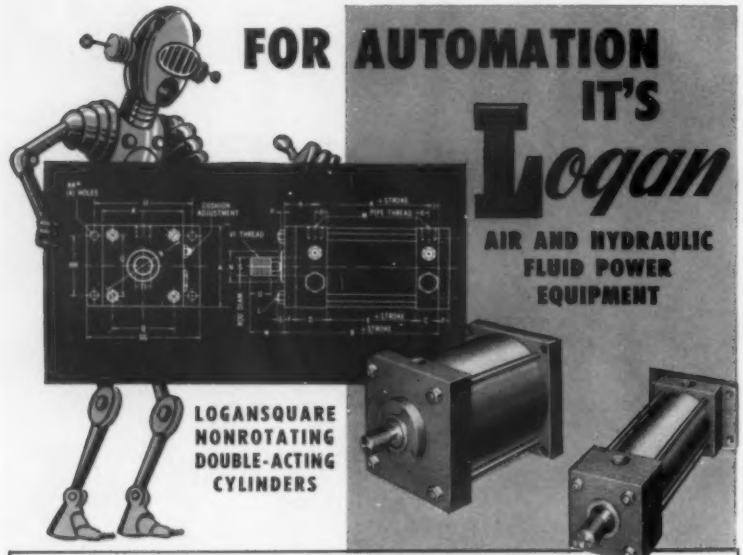
during the spray process, resulting in a coloramic, speckled finish with a custom-styled appearance.

One gallon of Zatex, priced from $3.75 to $4.00 depending on formula, has an estimated coverage of 100 to 125 sq ft. It can be sprayed at a wide range of fluid and air pressures with the greater the difference in pressures, the smaller the color particle and spray pattern. Zatex air dries to the touch in 30 min, is ready to handle in 4 hr, company reports; in a baking operation it will cure in about 2 hr at 140 F or 20 min at 225 F. It is noted that eventual surface wear and minor scratches are difficult to detect because of the surface texture and the fact that the color pattern is continuous throughout the thickness of the coating. The Glidden Co.

62—FLOW METER indicates rate, totalized flow

The Electro-Caloric Flow Meter is announced for the measurement and control of mass rate of flow of liquids. In this instrument, the rate of heat transfer through the boundary layer of a liquid is utilized to obtain a measurement of flow. Manufacturer says this instrument is especially suited for corrosive fluids and gases, slurries, hydrocarbons, biologics, beverages, and has applications in the chemical, pharmaceutical and food processing industries. It is designed to meet sanitary and safety requirements and its linear scale covers a wide range of flows, including pulsating ones. Measuring elements are not exposed to the fluid, it is noted, and there is no pressure loss or danger of clogging.

For remote indication and control, a directly produced electrical signal is available. The device is fully electronic without mechanically moving parts. The flow indicating instrument has a 16-in. long scale described as easy to read even at relatively wide range. The flow totalizing instrument is a watthour meter. Power consumption is under 100 w. Industrial Development Laboratories, Inc.



Bore	A	B	C	D	E	F	G	H	J	K	L	M	M +.000 −.003	P	Q ±.005	R	S	T¹	U	V¹	W	X	GG	HH	JJ	KK	AD	AE
1½	2	4	3	1½	1½	⅝	½	1⅝	⅛	2½	5/16-28	⅝	1⅝	⅛	1.458	2⅛	⅝	½	⅝	⅝-18	1⅝	⅛	3⅝	1⅞	2⅝	⅛	—	—
2	2½	4	3	1½	1½	⅝	⅛	1⅝	⅛	2½	5/16-24	⅝	1⅝	⅛	1.856	2½	⅝	½	⅝	⅝-18	1⅝	⅛	4⅛	2⅛	3⅛	⅜	—	—
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4	4½	5½	3½	1½	1⅝	⅝	⅝	1 11/16	⅛	3	5/16-24	⅝	1⅝	⅛	3.402	4 11/16	1	½	1⅛	1-14	1⅝	1/16	6½	3 11/16	5 7/16	⅛	—	—
5	5½	5½	3½	1½	1⅝	⅝	⅛	1 11/16	⅛	3½	5/16-20	½	2	⅝	4.154	5⅛	1⅝	⅝	1⅛	1-14	1⅝	1/16	7⅝	4⅛	6⅛	⅛	—	—
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8	8½	6½	3½	2	2	⅝	⅝	1 11/16	1/16	3½	½-18	⅝	2½	⅝	6.452	9⅛	1⅝	1⅝	1⅝	1⅛-12	2⅛	1/16	—	7 11/16	—	1/16	4⅛	10 11/16

Dimensions apply to no-stroke assemblies. Pipe thread is American (National) "Dryseal." Dimensions for cushioned and noncushioned are identical. All dimensions are given in inches. *Use bolts 1/16 smaller than "KK" (mounting holes).

Broad selection of mountings and mounting combinations. Pressures up to 150 psi air; up to 500 psi oil.

FREE CATALOGS ON REQUEST

YOUR DEPENDABLE SINGLE SOURCE FOR ALL YOUR AIR AND HYDRAULIC EQUIPMENT

Logan

MEMBER: Natl. Mach. Tool Builders' Assn., Natl. Fluid Power Assn.

PROPERLY DESIGNED — PROPERLY EQUIPPED

LOGANSPORT MACHINE CO., INC.
838 CENTER AVENUE, LOGANSPORT, INDIANA

PLEASE SEND COPY OF CATALOG:

- ☐ 100-1 AIR CYLINDERS
- ☐ 100-2 MILL-TYPE AIR CYLINDERS
- ☐ 100-3 AIR-DRAULIC CYLINDERS
- ☐ 100-4 AIR VALVES
- ☐ 100-5 LOGANSQUARE CYLINDERS
- ☐ 100-5-1 ULTRAMATION CYLINDERS
- ☐ 52 PRESSES
- ☐ FACTS OF LIFE
- ☐ 62 SURE-FLOW PUMPS
- ☐ 200-1 HYD. POWER UNITS
- ☐ 200-2 ROTOCAST HYD. CYLINDERS
- ☐ 200-3 750 SERIES HYD. CYLINDERS
- ☐ 200-4 HYD. VALVES
- ☐ 200-5 FITTINGS
- ☐ 70-1 CHUCKS
- ☐ ABC BOOKLET
- ☐ CIRCUIT RIDER

TO:

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

For more facts circle 629 on Reply Card

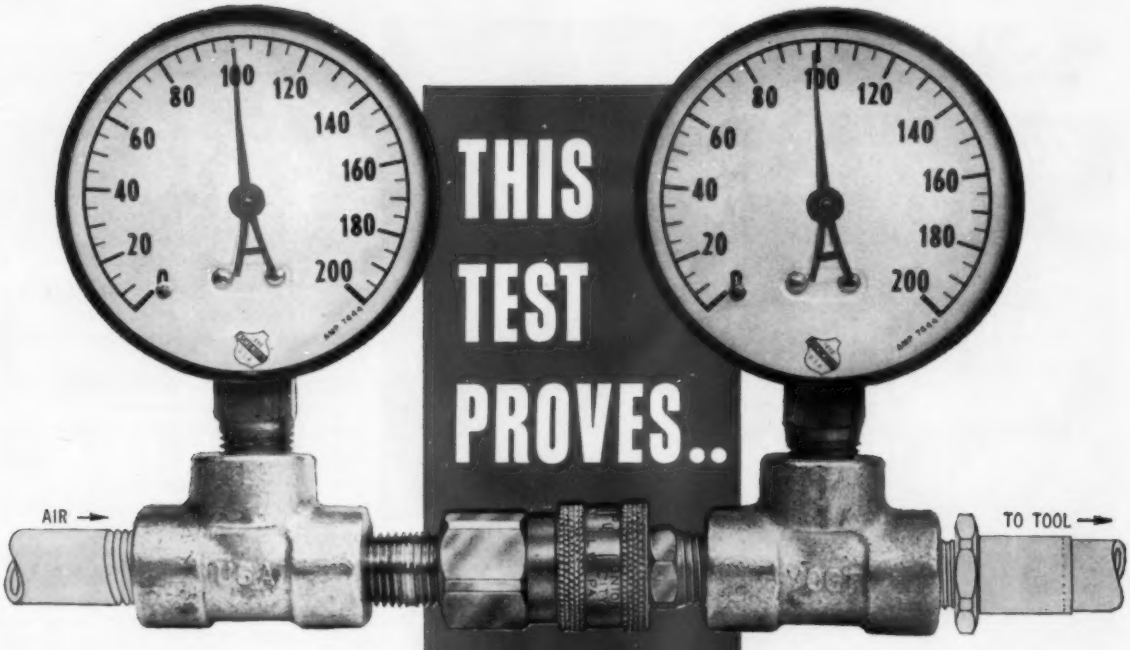
63—HEAT RESISTANT ROPE is lightweight, resilient

Made of Fiberfrax ceramic fiber—an aluminum-silicate material that takes heat as high as 2300 F—Fiberfrax Ropes are lightweight and resilient, and offer handling and installation advantages in many high temperature applications. Thirty

feet of Fiberfrax rope ½ in. in diameter weighs 1 lb, company notes, giving 50 per cent more rope length than equivalent amount of many other types. Its resiliency, a result of rope's long staple, makes it especially useful as expansion joint packing and high temperature caulking. Rope may also be used as insulator wrapping and for various high temperature gaskets and seals. Like paper, bulk and block forms of Fiberfrax fiber, rope is chemically inert and is unaffected by most furnace atmospheres, including hydrogen. Rope is made in typical three-strand form, of which 15 per cent consists of carrier-type fiber. It is supplied in coils with maximum length of 800 ft. The Carborundum Co.

64—GREASE CARTRIDGE is sealed unit for easy use

To promote faster, more efficient handling of grease, this manufacturer offers 1-lb sealed cartridges containing company's Grezall. They can be loaded quickly into an inexpensive gun available for use with these cartridges. Besides eliminating need for filling grease guns from a pail or drum, this method prevents contamina-



Snap-tite's quick-connect "Hi-Flow" coupling delivers maximum flow with minimum pressure drop

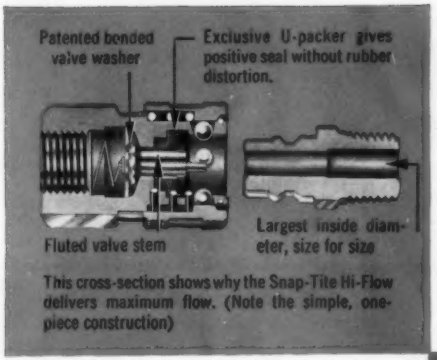
What this test can mean to you

Air tools are designed to operate most efficiently at 90 psi. For every 10 pounds of pressure drop under 90 psi your air tools lose 13% speed and power. If air pressure at your tools is below 90, in spite of a higher reading at your compressor, there are two corrective measures you can take:

One: overwork the compressor to overcome excessive pressure drop of your present couplings . . .

Or Two: install Snap-Tite "Hi-Flow" couplings at each air tool.

Tests run in plants all over America prove "Hi-Flow" couplings lose far less air pressure than any other quick-connect coupling.


Patented bonded valve washer
Exclusive U-packer gives positive seal without rubber distortion.
Fluted valve stem
Largest inside diameter, size for size

This cross-section shows why the Snap-Tite Hi-Flow delivers maximum flow. (Note the simple, one-piece construction)

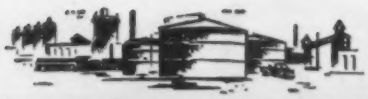
COMPARE QUICK-CONNECT COUPLINGS

You can set up this quick-connect coupling test in 5 minutes in your plant . . . better still, let your Snap-Tite representative show how really efficient quick-connect couplings increase production and maintenance efficiency in your plant. WRITE

Snap-tite

UNION CITY 5, PENNSYLVANIA

For more facts circle 630 on Reply Card



Use SAFETY GRIP-STRUT grating

Wherever a safe footing is required

Grip-Strut circular stairway on Shell Oil tank in Portland, Ore.

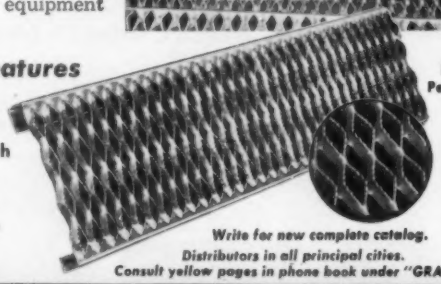
See how Shell Oil uses Grip-Strut for a safe ramp between tanks.

View looking down circular stairway on Shell Oil tank shown above.

SAFETY GRIP-STRUT is the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUT presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive NON-SKID footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

Important Safety Features

- ★ Fire proof
- ★ Slip proof
- ★ Maximum strength
- ★ Minimum weight
- ★ Easy to stand on
- ★ Cool in summer—warm in winter



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For more facts circle 631 on Reply Card

NEW PRODUCTS

(Begins on page 136)

tion of the grease by dirt and moisture. The gun is designed to deliver 10,000 lb of pressure with only a light pumping motion, driving new grease into areas with such force that worn grease is pushed out. Tower Oil Co.

65—SLIP-RETARDANT PAINT for floor, deck use

The slip retardant agent incorporated in this high quality enamel is non-metallic and thus sparkproof. The anti-slip paint is reported effective where oil, grease and water cause slippery surfaces. Since it contains a relatively soft anti-slip agent, it may be applied by spray or brush. Two coats are recommended, the second following drying overnight. Periodic stirring is required to re-incorporate the skid-resistant agent. The paint is available in light gray and maroon. E. I. du Pont de Nemours & Co.

66—PIPE TOOL repairs leaks quickly, economically

Described as simplicity itself, this tool consists of pipe clamp and patches shaped to fit specific sizes and provide a skin-tight fit when gasket is compressed. The pipe tool is made in two styles: saddle type in four sizes for use on pipe 6-in. diam. and less; and chain type (shown below) in sizes from 6 in. up. The patches

are steel with either Neoprene or asbestos gaskets. Patches of other materials can be ordered.

Because of its light weight one man can handle this tool. The clamp is placed around the leaking pipe—without shutting off line, reducing pressure or causing any loss of time or flow. Patch is applied directly over leak and sufficient pressure applied by the clamp to stop leak. The patch can then be welded to pipe; or clamp can be left on until it is convenient to weld the patch. The permanent patch seals the leak—and is as strong as the pipe itself, says company. These tools have been tested under pressures to 6000 psi. For areas where welding is hazardous or prohibitive, manufacturer has developed a cold-weld process for welding patch to pipe. Atlas Industries, Inc.

(More New Products on page 234)

HOFFMAN'S ENGINEERED SYSTEMS designed to do the tough jobs in industry

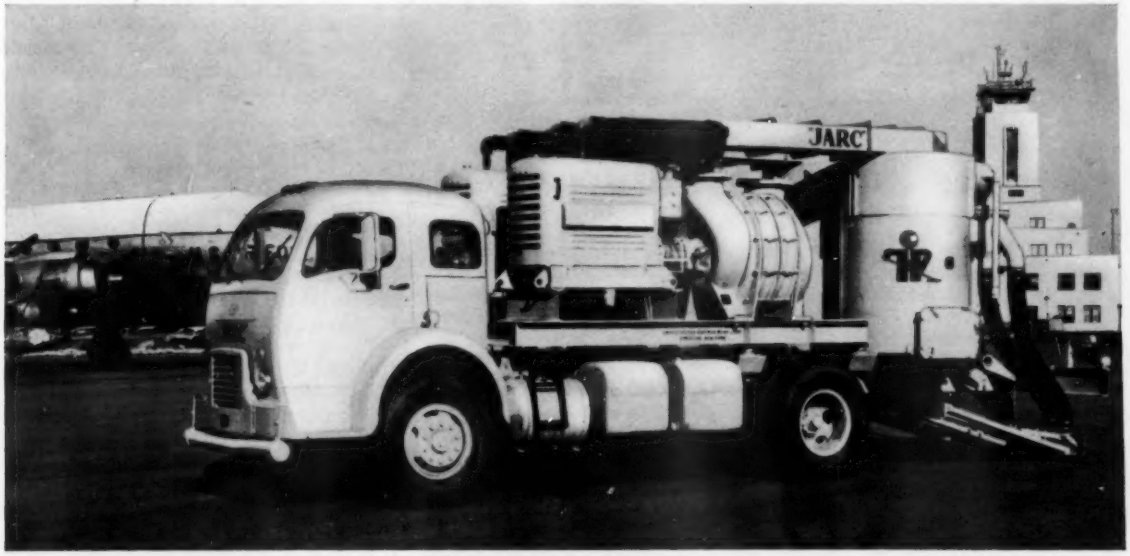
JET RUNWAY CLEANER ILLUSTRATES HOW STANDARD-DESIGN HOFFMAN BLOWERS ARE ADAPTABLE TO YOUR VACUUM-PRESSURE OPERATIONS!

Until recently, millions were spent every year on jet aircraft engine repairs and replacements, for want of a method for completely removing from runways such destructive debris as nuts, bolts, screws, aluminum scraps, sand, gravel, wood and other particles.

In their solution to the problem, Hoffman engineers selected two of Hoffman's standard-design centrifugal exhausters and mounted them on a truck unit. The machine they developed, the Jet Aircraft Runway Cleaner ("JARC"), provides a vacuum capable of cleaning and removing all unwanted material from an area of two million square feet in about eight hours. The six nozzles at the rear, spaced over an eight-foot vacuum surface, suck in air at a rate of 350 m.p.h.

The multistage exhausters on the "Jarc", like all Hoffman blowers, may be operated 24 hours a day continuously, day in and day out. They can also be depended on in other important respects: there is no pulsation or vibration, thanks to the dynamically balanced impellers. There are no gears or similar parts to wear or create mechanical noise. The air delivered is as clean and dry as that entering the intake, since there is no internal lubrication.

The "Jarc" is only one example of the almost infinite adaptability of Hoffman blowers. If you have *any* operations requiring the use of a low-pressure compressor or a high-pressure blower, discover how much expense and trouble you will save by installing blowers and exhausters made by Hoffman. Have our air appliance engineers call at your plant and discuss your requirements in detail.



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High-efficiency centrifugal separators
Stationary and portable vacuum-cleaning equipment
Process equipment
Pneumatic systems for radioactive materials

For more facts circle 632 on Reply Card

INDUSTRIAL FILMS

Mica Mat Production

"A PROGRESS Report on G-E Mica Mat" describes the early history and uses of mica for electrical insulation, and the development of mica mat. One section of the film takes the viewer into the Coshocton plant of General Electric Company for a step-by-step tour of the production of mica insulation material "by the mile."

Mica mat provides unusual physical properties, in addition to electrical insulating ability and high heat-resistance of mica products. Besides summarizing this phase of mica mat usage, the film shows the results of many tests and describes the application of such mica mat products as tapes and wrappers, pressed composite sheets, custom-sized tubes, segment plate and fabricated segments.

A 20-page booklet—describing the film—presents key pictures from the film sequence. The booklet has been produced to give the mica mat story in capsule form. It will be useful for "previews" of the showing, and for passing out to viewers after a showing.

Information on the availability of the film and booklets may be obtained by writing to General Electric Company, Laminated and Insulating Products Department, Section NR-1, Coshocton, Ohio.

Metals Finishing

A MOTION picture with sound, dealing primarily with the electroplating facet of metal products finishing, is now available.

Entitled "A Brighter Tomorrow," this 16mm color film which runs approximately 30 minutes, observes and describes metals finishing processes and applications.

The manufacture of two products for the electroplating industry are followed from the drawing board to the finished product. Scenes taken in the laboratory show some of the meticulous procedures employed in the preparation of precious metals salts and solutions used for electroplating.

A print of the film is available free of charge to qualified organizations for showing at sales meetings, conventions, educational seminars, or any public gathering interested in the electroplating subdivision of the metals finishing industry, from Bart-Messing Corp., Belleville, N.J.

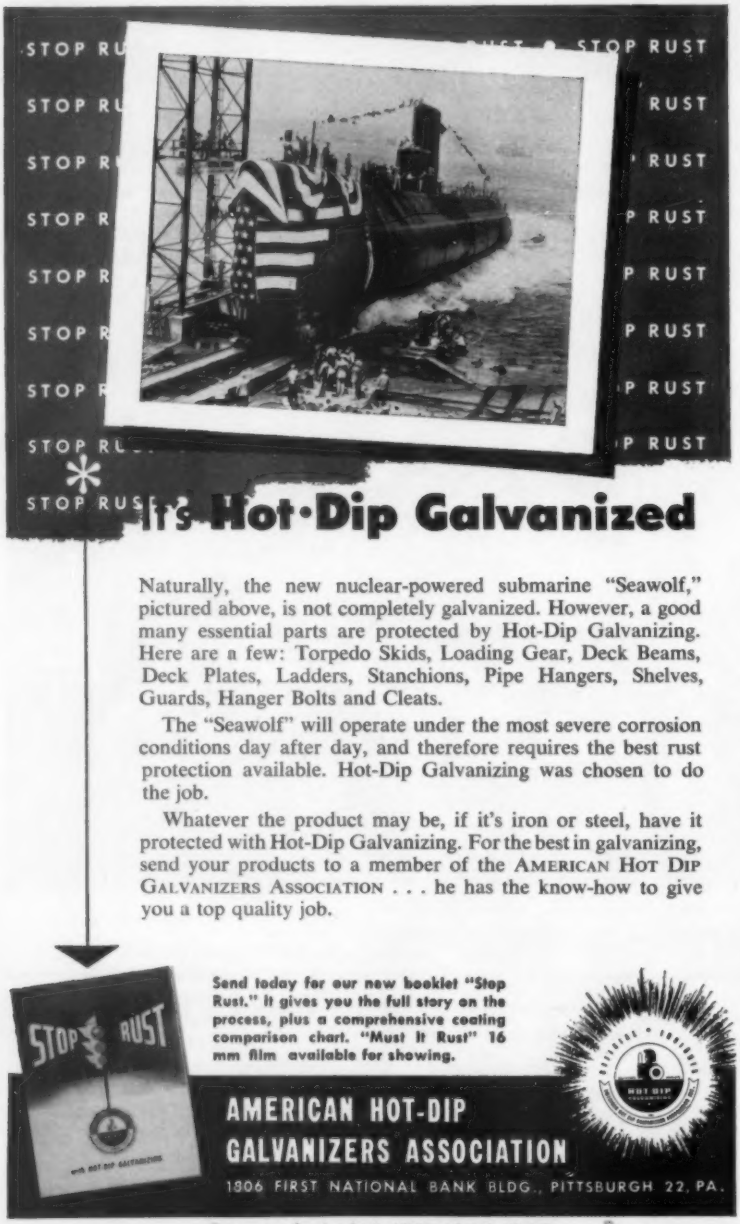
Compressors in Animation

NEW METHOD of animation, employing changing shades of color, is used to present a 16mm, 17-minute sound and color motion picture, "Compressed Air Power." It begins with a demonstration of the operation of the simplest and most familiar type of air compressor, the bicycle pump. This simple compressor is then converted, visually, into a basic, power-driven compressor by replacing hand power with a conventional crank and flywheel.

Operating principles of this single-acting compressor are presented through the entire compression cycle by animated development of a typical compressor indicator card showing theoretic adiabatic and isothermal compression and effects of cooling to dissipate heat of compression.

Other positive-displacement types of compressors including sliding-vane, lobe, and liquid piston, followed by the operating principles of dynamic compressors including centrifugal and axial flow, are presented.

The film is available at $60 per print from the Educational Committee of Compressed Air and Gas Institute, 1410 Terminal Tower, Cleveland, Ohio.


STOP RUST
STOP RUST
STOP RUST

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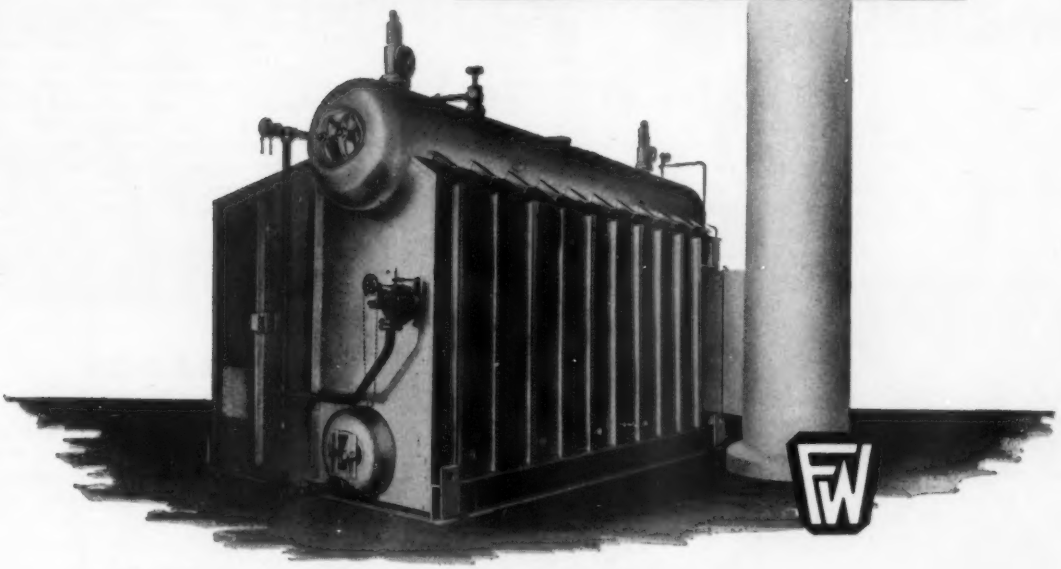

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CONSTRUCTION FEATURES

- 36″ steam drum and 24″ water drum
- Staggered boiler tube arrangements
- Closely spaced waterwall tubes
- Water cooled target wall
- No headers—Low circulation loss
- Light, highly efficient refractory and insulation
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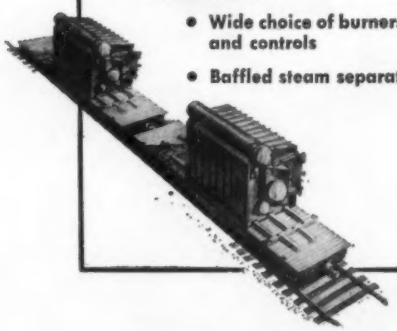

HERE IS a compact, space-saving steam generator that is completely factory assembled and shipped to you ready to set on a simple, low-cost foundation—ready for your fuel, steam and electric connections. There is only one outlet to the stack, and this has a simple, flanged connection as shown above. Extremely compact design permits access to boiler rooms through average building openings.

Low refractory maintenance is assured by the use of closely-spaced waterwall tubes and water-cooled target wall. The boiler interior is easily accessible for cleaning through a large access door in the rear furnace wall, and dusting ports are provided along the boiler bank side at intervals of not more than 42″. Soot blowers can be furnished as original equipment or installed later.

Available in capacities from 10,000 to 50,000 lb/hr, the *new* FW Packaged Steam Generator represents the last word in modern steam plant design. For complete details, send for Bulletin PG-55-3. *Foster Wheeler Corporation, 165 Broadway, New York 6, N.Y.*

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For more facts circle 634 on Reply Card

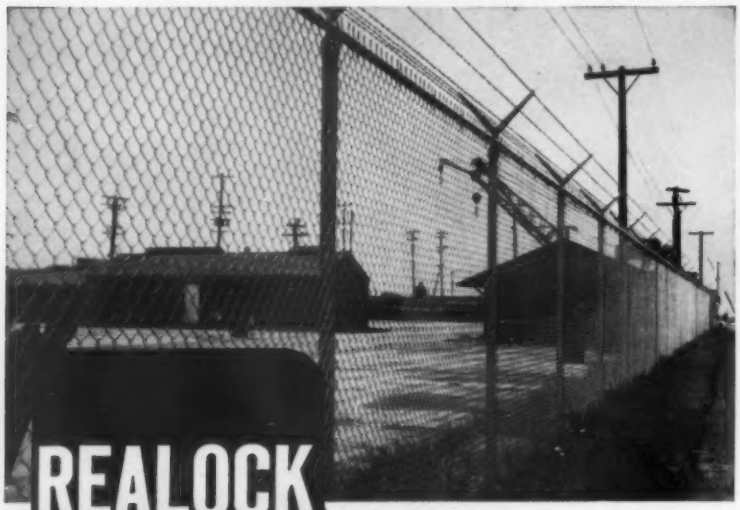
Maintenance Trucks— Plants Built Own to Fit Job

(Continued from page 85)

and its appropriate tap drill. On one end of the unit are two bins divided into small compartments carrying assorted nuts, bolts, screws, wire connectors, pipe connectors, couplings, elbows, tees, and other miscellaneous small items. Number and size of tools carried for each craft are determined by experience. We find that our maintenance and installation frequencies are electrical, carpentry and plumbing in that order. Our unit is stocked accordingly. When our demand warrants it, we plan to have separate units for electrical, plumbing, carpentry and general maintenance, each stocked with appropriate tools and supplies. Then, when an installation or rearrangement is started, one or more units with materials will be dispatched to the job, leaving one unit always available for general maintenance.

In actual use, the unit has been a great time saver. Very few trips are made to the equipment room for tools or supplies. In many cases of emergency maintenance the unit is sent to the job on a small fork truck. A wooden platform is then placed on the forks and the truck itself is used as a scaffold, doing away with the necessity of transporting ladders to a small job.

Another advantage: when a man is working at a job site, he has a place to keep his hand tools instead of just laying them on a trunk or open tool box. This has reduced our tool loss to quite an extent. Also the men can work right up to quitting time without a trip back to the equipment room to lock up tools for the night. While it is true that its appearance has caused some comment, there is no doubt that "the wagon," as it is called, has saved a lot of travel time and has enabled the Plant Engineering Department to give prompt service and better completion dates to its only customer, Litton Industries.



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helps you

- reduce number of guards
- prevent burglary, arson and vandalism
- stop pilferage

You get all of these advantages and more when you install a sturdy Realock Fence. The tough, heavy fence fabric will give years of service . . . terminal posts are made of full-weight tubular, I- or H-structural steel sections . . . and, for maximum security, Realock Fence is topped with three, five or six strands of tough barbed wire.

What's more, Realock is long-range protection. It's made of full-weight steel that's heavily galvanized after weaving so that it can give years of trouble-free life under all weather conditions.

THE COLORADO FUEL AND IRON CORPORATION, Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION, Buffalo, New York

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REALOCK FENCE
THE COLORADO FUEL AND IRON CORPORATION

CF&I

BRANCHES IN ALL KEY CITIES

For more facts circle 635 on Reply Card

Pump Station Runs Itself

(Continued from page 87)

solenoids and control relays will be hermetically sealed. This, against smog, fog and salt air, for all stations will operate in areas subject to sea air. And silver relay points break down rapidly under saline contamination (primarily because fog, when mixed with SO_2 particles in smog, results in sulphuric acid—and quick corrosion).

Small semi-unattended stations aren't a rarity. But those now in the planning, and the now-operative Seaside installation, are big-scale particularly considering their seasonal work-load.

Future stations, incidentally, may be wholly dieselized, this to avoid connected-load charges for stations which but occasionally draw upon power.

Plants installing pump stations—especially those in industrial subsidence areas—might well look to Los Angeles County's "lock and key" pump houses—stations designed to run themselves, and needing but periodic check by maintenance staffers.

Abrasive Wheels

(Continued from page 92)

(¾ in. by 2 in. by 4 in.) was tested for its RC hardness to insure uniformity.

e. All specimens and abrasive wheels were weighed in grams to attain better accuracy.

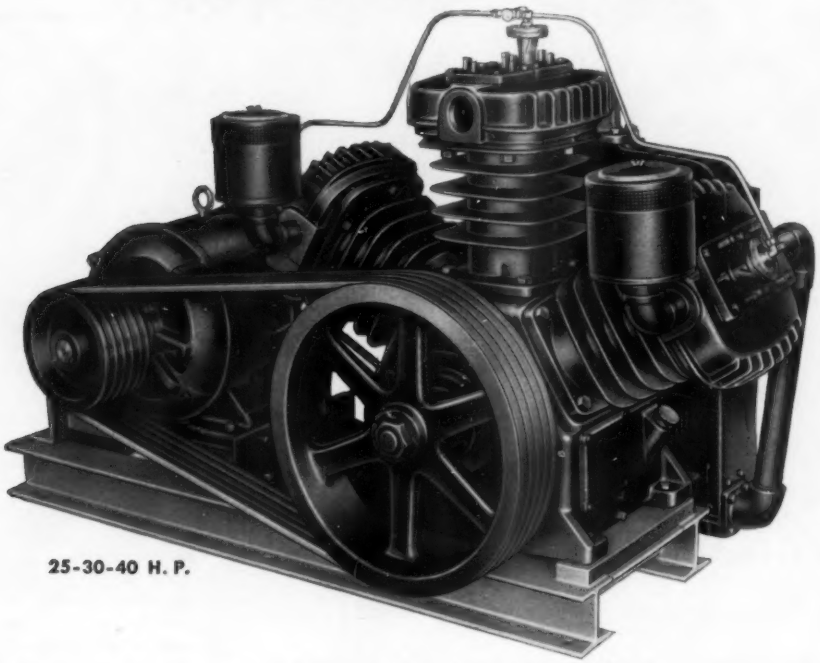
f. Test runs were timed with a stop watch. Two periods of 2½ minutes each were applied to one sample. This provided a break for the operator and allowed cooling. Actual conditions were to be simulated as closely as possible.

g. Data was recorded on a form especially developed for this series of tests.

Analysis of the results of hundreds

THE NEW CURTIS MODEL C-100
TWO-STAGE, AIR-COOLED AIR COMPRESSOR

Provides Higher Operating Efficiency Costs Less to Install



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THIS NEW Curtis Two-Stage will deliver more air per minute, per horsepower and per kilowatt hour of electrical energy consumed, thus assuring a saving in your electrical bill.

It's Air Cooled, thereby eliminating expensive water bills and assuring quick and easy installation with no complicated plumbing problems.

The new C-100 embodies all the well-known Curtis engineering features such as centro-ring oiling and Timken Main Bearings.

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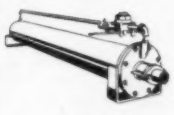
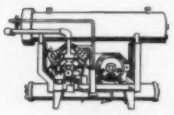
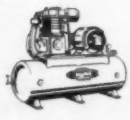


AIR HOISTS
AIR CYLINDERS



PACKAGED LIQUID
CHILLERS



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AIR COMPRESSORS

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AND
REMOTE
AIR
CONDITIONING

For more facts circle 636 on Reply Card

THIS IS THE STORY of three men and a VALVE . Joe, a chemical engineer, needed valves that could handle tough corrosives. Bill, a refining engineer was looking for valves that gave a positive shut-off. Tom, working for a large industrial firm, needed valves that sealed both upstream and downstream. All three solved their problems by specifying Hamer Visible Wedge Valves. These remarkable valves combine the double sealing action of precision metal-to-metal fit augmented by dependable seal rings. The wedges are trimmed with nickel, while seats are trimmed with stainless steel to withstand the roughest corrosive conditions. The full-view wedges are handwheel operated --can't blow out or drop on a toe. The wedges pivot so no lifting is necessary. So if your plans require long service, sure-seal shut-off valves, by all means specify

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of tests shows that only approximately 15 per cent of the costs represent abrasive cost, and 85 per cent is spent for labor in removing a given amount of metal. Therefore, as a rule of thumb, wheels having the greatest capacity for removing metal are to be preferred for optimum results.

Ditto's Plant No Carbon Copy

(Continued from page 111)

taling about 3,000 sq ft are now ready for use. These house service facilities such as electrical substation equipment, lockers, store rooms and boiler room equipment.

Theoretically, the entire 242,000 sq ft manufacturing area could be double-decked by mezzanines with 8-ft headroom. This is unlikely, since many production machines require greater clearances.

But, where necessary, mezzanines for normal load conditions can be constructed by bolting or riveting steel supports to the building columns.

Since there is a limit to how far a plant can grow from within, provisions for outward and upward expansion have also been incorporated into the structure of the Ditto plant.

Demountable sandwich walls on the west and east ends of the plant permit expansion over more areas of the 27-acre site. These non-load bearing walls are unobstructed by permanent installations. On both west and east ends of the building, foundations and framing are already installed for expansion.

The demountable walls combine brick, aluminum sash with Indiana limestone sills, and insulated aluminum faced sandwich panels. Both sash and aluminum panels are demountable and can be used over. The masonry work is not salvageable.

TV Turns Eye on Paper Making

(Continued from page 128)

two floors below. The operator glances up at the TV screen, which is approximately the size of a 10-in. home screen, and sees exactly what's going on in the pulp washing tank. The only time he needs to leave his station for a personal investigation is when the picture on the TV screen shows him a danger sign.

Both the television camera and the receiver remain in fixed positions. The "program" they record is acted out on the same "stage" all the time. So there's really no need for flexibility.

Since the atmosphere in the pulp-washing area has a heavy moisture content and a small percentage of fumes, both camera and receiver are enclosed in pressurized transparent

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New illumination data and complete up-to-dating of specifications for 36 different RLM industrial lighting units, make this new RLM Book more useful than ever to buyers, sellers and specifiers of industrial lighting equipment. An important change concerns the use—for the first time in RLM Specifications—of the Zonal Method of computing Coefficients of Utilization and illumination on room surfaces. The tables printed in this new edition are based on this method. You'll also find helpful light distribution curves on both incandescent and fluorescent equipment, including the new Semi-Direct fluorescent units, which direct 20% to 30% of the light upward. In addition, there are important changes in the RLM Standard Specifications covering materials, construction and photometric performance.

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For more facts circle 638 on Reply Card

cases. These assure maximum picture clarity despite the dampness. Forced fresh air ventilation keeps the equipment cool and prevents condensation from accumulating.

As the result of this new system of remote observation, there have been some noticeable changes in Schweitzer's Stock Preparation Department, all of them contributing to the speed and efficiency of paper production.

Because the operator no longer needs to spend so much of his time making a routine check of machinery, he has been freed to take on other tasks. Now he can assist in making up batches of chemicals and help out the men who work on the process immediately ahead of his. In spite of a small increase in his work load, his job as a watcher of machinery is easier. He goes up to the third floor only when the picture on his television screen tells him the situation is getting out of hand.

This leaves the operator less fatigued. It also means that he can give his undivided attention where it is most needed—at his primary post.

Another beneficial result of the installation is that, in a sense, the whole pulp-preparation process has been sped up. Knowledge of impending breakdowns in the dewatering tank is received by the operator much faster than ever before. Necessary repairs, therefore, can be made much faster.

From Plant Manager Charles Petzold's point of view, the closed-circuit television system is a worry eliminator. Here he knows he has one operation, at least, that is under complete control.

Industrial television has been the target for some criticism on the grounds it is nothing more than an elaborate means of spying on workers, and, if used extensively, can eliminate some classes of personnel entirely.

Schweitzer's venture into industrial television has proved that, if anything, TV is not a replacement but a valuable assistant to the worker on the job. Prior to the television installation, the turnover among machine watchers was an almost constant one. Easier work conditions have made for a more stable labor picture.

"We didn't install this system because we wanted to spy on our help," says Mr. Petzold. "We were mostly interested in watching our process and getting better control of it. We were also interested in making the worker's job easier and more efficient, if we could, not to get rid of him."

Plans Other Applications

In fact, the Schweitzer Company has been so pleased with the results that it is making definite plans to expand the installation. The dewatering screen is not the only part of their process that could be put under the camera's eye to good advantage.

They could use one or two more cameras in different locations along the pulp-preparation process. Then all an operator would have to do to see what was happening at other phases of the operation would be to switch from one channel to another.

When they go ahead with these plans, Schweitzer will probably also alter their circuits so that they can use ordinary commercial receivers. The gain would be in better reception and bigger, easier-to-look-at pictures.

Mr. Petzold can also see applications of the observation-by-remote-control idea in other areas of the paper mill. There are many places where a built-in television system could ease the strain of plant management.

In the power house a television camera and monitor would be particularly helpful. It could centralize all the engineer's data for him at the switch of a knob.

Better plant protection is still another thought. Why send a watchman into possibly hazardous areas when a television camera can give him the same information easily, quickly, and with less danger to life and limb?

Plant engineering at Peter J. Schweitzer, Inc., is sold on television's career in industry. As far as they are concerned, for keeping the heavy machines under control, and under constant supervision, there's nothing like the all-seeing, ever-watchful "eye" of a television camera.

PROOF POSITIVE

foster MASTIC COATING RESISTS FIRE

Arc welding above freshly-applied Foster 60-60N (left) fails to ignite coating; while ordinary asphalt mastic (right) ignites and burns fiercely until consumed.

foster Fire-Resistive Mastic 60-60N is:

Non-flammable during (and after) application by spray or trowel—no danger of ignition from welding sparks or splatter.

Fire-resistive when dry, won't add fuel to accidental fire exposure. (Foster 60-60 is still the only weather-coating listed by Underwriters' Laboratories).*

An effective barrier to moisture vapor; a requirement for coating low temperature thermal insulations, (vapor permeance 0.02 perm).

Outstanding for protecting steel and thermal insulation from weather and chemicals (both liquid spillage and atmospheric fumes);

Unparalleled by any conventional mastic coating for retained flexibility under prolonged heat and sunlight.

*Dry film of 60-60N is identical with dry film of 60-60. 60-60N is an improved mastic made with non-flammable, non-toxic volatile solvent.

A companion product, Foster's Fire-Resistive Mastic 60-60 is listed and inspected by the Underwriters' Laboratories, Inc.

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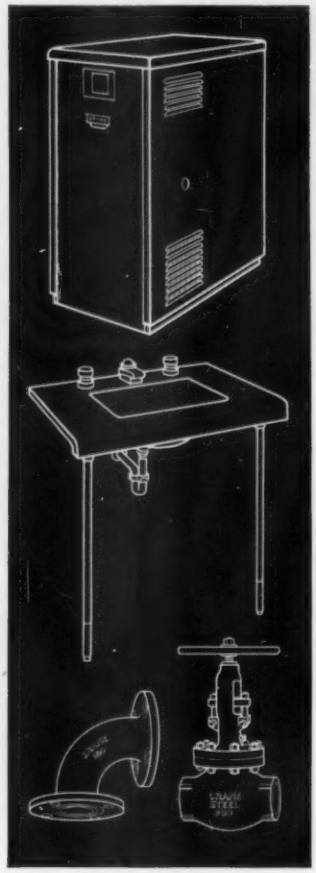

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New Plant Construction—Advance Information

(Continued from page 134)

ment program to exceed $57 million through 1956. Company has allocated more than $30 million for plant expansion and improvements at the Rochester plant; $11.5 million for the Tennessee Eastman Co., at Kingsport, Tenn.; and between $7 and $8 million for the Texas Eastman Co., at Longview, Texas.

Syracuse, N. Y.—The Carrier Corp., Carrier Building, Syracuse, N. Y., manufacturers of air conditioning, refrigeration and industrial heating equipment, has plans under way for new buildings and equipment at local plant. Work will include construction of new administration, personnel and research buildings at an estimated cost of $5 million. Production facilities will be expanded and new equipment installed at an additional cost of $5.5 million. Another $1.5 million will be spent on miscellaneous plant and building improvements.

Cincinnati, Ohio—The General Electric Co., Schenectady 5, N. Y., has plans under way for the erection of a new Jet Research Center at company's jet engine plant located here. Construction of the supersonic test center will begin at once and is scheduled for operation in the early part of 1958. The new Research Center, with equipment, will represent an investment of $20 million.

Portsmouth, Ohio—The Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit, Mich., has announced plans for company expansion and improvement of its Portsmouth Works. Company plans are to increase steel making capacity to about 1.5 million tons, by January 1957. Cost of expansion and improvements through 1956-1957 will approximate $20 million.

Youngstown, Ohio—The Youngstown Sheet & Tube Co., 1954 Stambaugh Building, has authorized plans for the expansion of its steel-making capacity finishing facilities at both the Youngstown and Chicago operations, over the next two years. Improvements are scheduled for completion at both plants by late 1957. Completed program will cost an estimated $250 million and will boost company's steel-making capacity by 17 per cent.

Klamath Falls, Ore.—The Johns-Manville Corp., 22 E. 40th St., New York, N. Y., has announced plans for the construction of a new insulating board plant near here. New plant will have a floor area of 275,000 sq ft, and is scheduled to be in operation by mid-1957. Cost of plant installation along with timberlands will ultimately cost in excess of $12 million.

Oaks, Pa.—The Alan Wood Steel Co., Wood Road, Conshohocken, Pa., has approved plans and work will get under way soon on new plant for the manufacture of steel lockers, cabinets and shelving. Plant is expected to be completed and in operation by mid-1957 and is reported to cost approximately $2 million.

Beaumont, Texas—The Alco Products, Inc., subsidiary of the American Locomotive Co., Church and Dey St., New York, N. Y., has authorized plans for expansion at local plant here, the former Beaumont Iron Works Co. Cost of combined expansion and new building program is expected to cost $1.5 million.

Freeport, Texas—The Dow Chemical Co., 1000 Main Street, Midland, Mich., has announced plans for company expansion through 1956 and 1957 at its Texas operations to approximate $45 million. Program calls for expansion of present facilities, new production plants and new research and service facilities.

Casper, Wyoming—The Standard Oil Co. (Indiana) has approved plans and work will begin this summer on a completely new lubricating plant at local refinery. Four-unit plant for the processing of lube oils will include: a 4,800 bbl per day vacuum pipe still; a 1,000 bbl per day de-asphalting plant; a 1,500 bbl per day extraction unit, and a 2,000 bbl per day dual purpose dewaxing and deoiling unit.

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NEW BOOKS

for the plant engineer

Electrical Technology

ELECTRO-MAGNETIC MACHINES by M. Langlois-Berthelot. Size 8¾ by 5⅝ in.; illustrated; 535 pp including index; cloth bound. Published in 1955 by Philosophical Library, Inc., 15 East 40th St., New York 16, N. Y. Price $15.00.

READING of this book in the French edition by engineers and educators brought out its importance and unique method of presentation. The present edition in English gives students, technicians and industrialists an opportunity to profit by the author's experience and comprehension of the subject.

The book relates the various kinds of electrical machines to each other, recognizing them as being one family having a common basis of existence. Fundamental principles that remain rather than practice that frequently changes are established firmly in the text of this book.

It is recommended that prospective students of this work have a working knowledge of Calculus. By this it is not implied that this book is particularly heavy on higher mathematics. It does, however, have passages where the application of such knowledge is valuable.

The book is divided into five major parts, namely: The families of electrical machines, general anatomy and physiology of electrical machines, the machine from the designer's standpoint, the machine from the user's standpoint, abnormal conditions of operation, and miscellaneous general comments. In the appendix, notations, symbols and units have been given consideration. A unit conversion table is also included.

Hydraulics and Pneumatics

HYDRAULIC & PNEUMATIC Operation of Machines. Size 9 by 6⅛ in.; 192 pp including index; illustrated; cloth bound; printed in Gr. Britain. Published by Philosophical Library. Inc., 15 East 40th Street, New York 16, N. Y. Price $7.50.

THIS BOOK PROVIDES practical information on an important aspect of hydraulics, the application of pressure in the operation of industrial machinery. In addition, it contains a major section devoted to pneumatic power which may have applications that are similar to those using hydraulic power transmission.

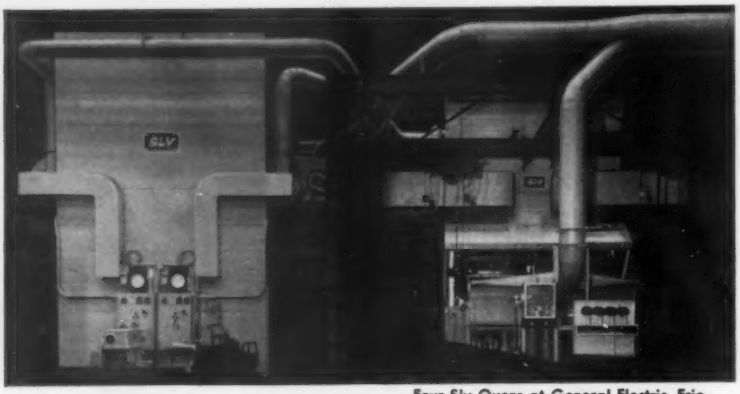
Various types of pumps are discussed in the initial chapter of the book leading to a section on valve gear and one on hydraulic circuits. Other chapters pertain to hydraulic machine tool operation, hydraulic press developments, design features and accumulator systems.

In part two, relating to pneumatic operation, the book contains information on such topics as air compressors and structural details, design of pneumatic circuits, air operated jigs and fixtures, and hydro-pneumatic operation.

Atomic Energy

PEACEFUL USES OF ATOMIC ENERGY. Size of volumes, 11¼ by 8¾ in.; illustrated; cloth bound. Published by Columbia University Press, 2960 Broadway, New York 27, N.Y. Prices—Vol. 2, $8.00; Vol. 3, $7.50.

VOLUME 2 CONTAINS approximately 471 pages. It includes all information developed at the International Conference in August of 1955 on the background physics and the construction and operation of research reactors. A number of the papers included in this particular volume deal in higher mathematics involved in the study of atomic energy. The following is a portion of the topics treated: neutron decay, neutron scattering by Deuterium, high energy particle accelerator, theory of



Four Sly Ovens at General Electric, Erie.

4 SLY Ovens Give Close Baking Control at G. E.

Correct baking of varnish on armatures, field coils and frames is essential to insure full protection to the units in later use. Four tower-type Sly Ovens at the Direct Current Motor and Generator Department at General Electric Co., Erie, Pa., provide the exact temperature required. They are an integral part of production, assuring a smooth, continuous flow.

The ovens are arranged in pairs. Each is a double-compartment oven with a common wall separating the zones. Each zone has its own heating and control system and individually automatic, program controlled conveyor system to meet the required, preheat, first and second baking operations. Complete cycle includes preheating, varnish dip, 4-hour bake, varnish dip and another 4-hour bake. Operations are such that the ovens reach their required temperatures prior to the start of the work day.

This installation is typical of the time and money savings Sly Convectioneered Ovens bring to drying, baking and finishing operations. *Write for catalog describing Sly's complete line.*

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nuclear fission, gamma-rays from fission products, experience with the British Experimental Pile O, and Swiss research reactor.

VOLUME 3 IS about 389 pages in length. This is another unit of the sixteen volume collection on the Geneva Conference on the peaceful uses of atomic energy. It provides a complete summary of reactor technology as of the time of the conference. Discussions presented in the book cover worldwide central station power reactor designs. Attention is also given to problems and the anticipated direction of research and development for each of the major types of reactors.

Some of the specific items which were covered at different sessions are as follows: economics of fuel cycles, USSR atomic power stations, liquid metal fuel reactor, automation of reactors, boiling water reactor, Los Alamos reactor, and USAEC power reactor program.

The collection of the sixteen volumes amounts to a first complete reference work on the peaceful uses of atomic energy.

Electric Crane Reference

CRANE HANDBOOK compiled by H. G. Greiner. Size 7¾x5¼ in.; 176 pp.; illus.; tables; index; cloth bound. Published by Whiting Corporation, Harvey, Ill. Price $10.00. Free to qualified engineers.

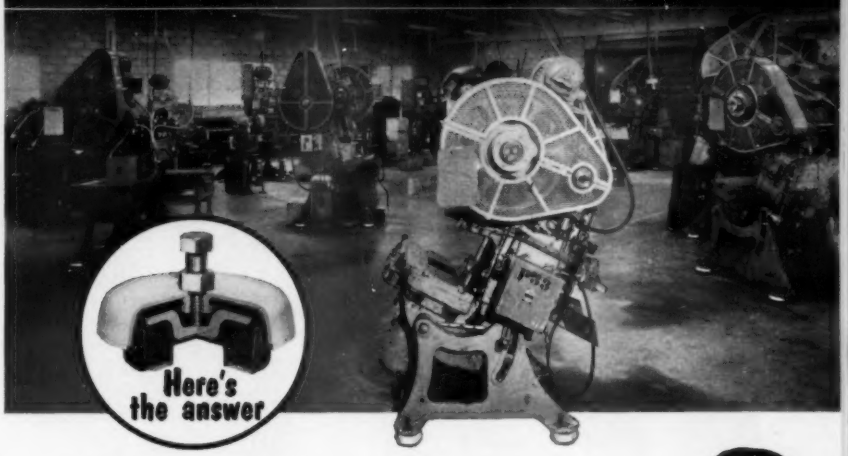
FOR MANY YEARS, "Crane Engineering" has been a reference on electric crane engineering. "Crane Handbook" is its successor, a new and revised edition of the original book, presented in handy pocket size.

In this edition, designs now considered obsolete have been excluded, and greater consideration has been given to crane service. This is in an effort to make crane users aware of the various classes of service and what is required for good performance in each class. More engineering data is included in this edition than in the original book concerning modern design, which can be used in the preparation and checking of specifications for new crane projects.

In its 17 sections, the handbook deals with terminology and classification; elements of design; safety features; erection; operation and maintenance instruction; sample specifications for different classes of service; auxiliary equipment; and modernization of old cranes.

For a free copy of "Crane Handbook," qualified engineers and others directly interested in crane specification should write on business letterhead, giving job title, to Whiting Corporation, Advertising Department, Harvey, Ill.

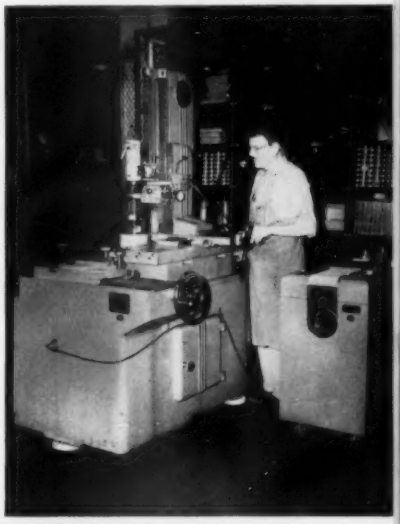
How Biggest Toy Maker of West Cuts Seasonal-Change Costs With Flexible Plant Layout



To meet ever-changing production and tooling requirements, Mattel, Inc., uses Leveling Barry Mounts to mobilize its 22 open-back inclinable punch presses ranging from 10- to 60-ton capacity. Now the entire press-room layout is revised whenever the product line changes — because all 22 presses can be relocated in less than a day by three men and an industrial truck. The result — smoother flow of materials, less handling between operations, simplified expansion of press department, easier maintenance, and reduction of noise and vibration transmitted to other parts of the building. Mattel says, "Our Barry Mounts have paid off their investment several times over".

Ask Barry how YOU can boost output by mobilizing machinery.

ATF Proves Barry Mounts Cure Vibration Troubles in Testing Precision Gears



The gages on sensitive gear checkers at American Type Founders went crazy when lift trucks rolled by, and other machines sent vibrations down columns or through walls and floors. But now, with the testers "floating" on Leveling Barry Mounts, gear checking continues without interruption under the worst vibration conditions. For machine tools also, ATF has proved Barry Mounts make it easier to hold close tolerances and to get higher operating speeds by keeping vibration from affecting feeds, cutting tools, or work.

Ask Barry how YOU can protect precision machinery.

Here's How YOU Can Gain These Advantages

Write for our plant survey booklet M-556 that tells you where to look for these kinds of savings in your plant; then talk over your machine-mobility needs and vibration problems with a Barry representative or Barry Mount distributor.

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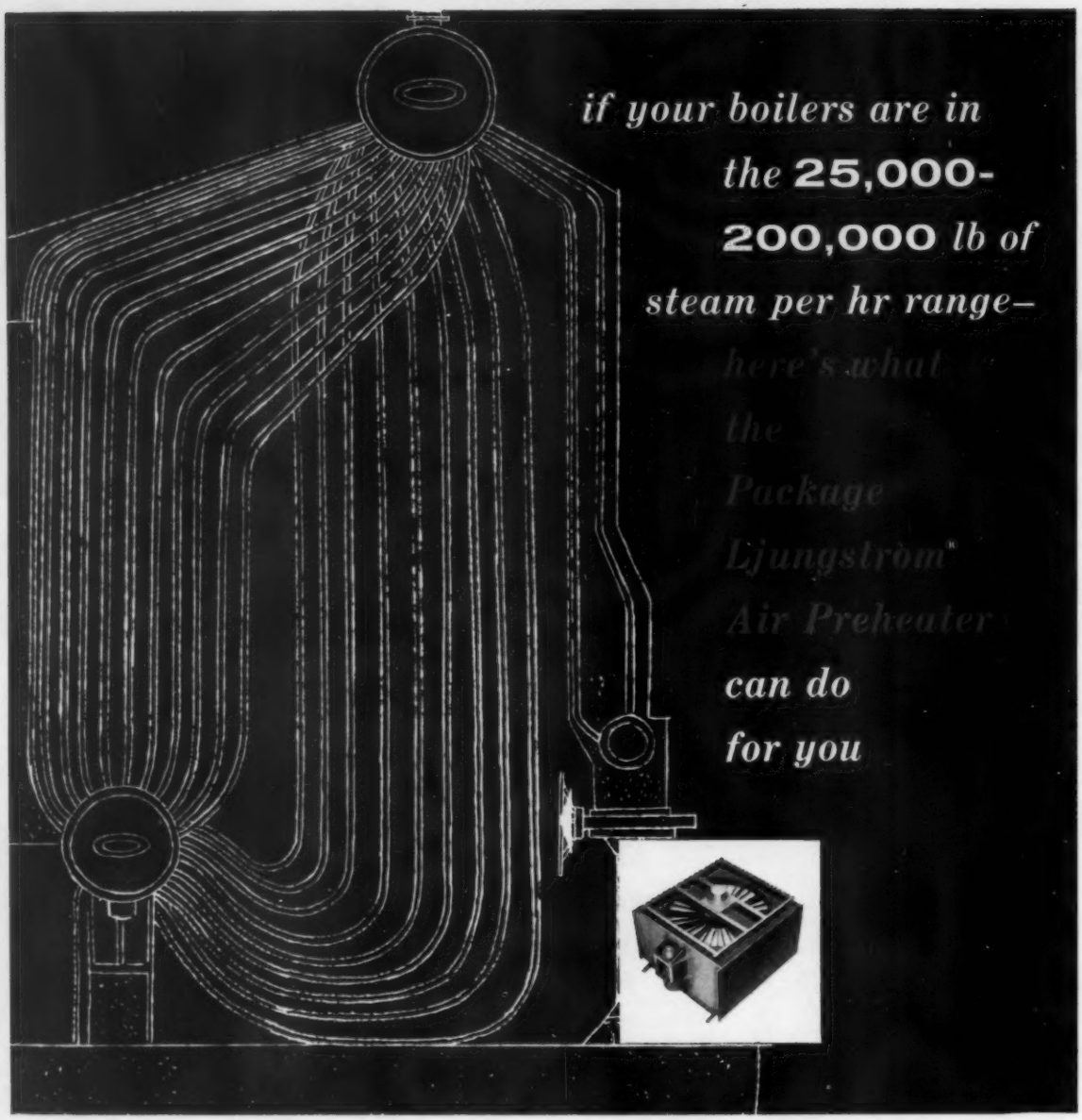

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3. **Lower boiler maintenance** – preheat means more efficient combustion of fuel – therefore, there's less slagging and boilers stay in service longer between overhauls. Stack gases are cleaner, too, which helps reduce smoke nuisance and stack maintenance.

4. **Makes low grade fuels practical** – since air preheat means higher furnace temperatures, it means, too, that low-grade fuels can be burned effectively.

If you'd like more details on how the Package Ljungstrom Air Preheater can improve the efficiency of your boiler plant – write the Air Preheater Corporation. Our field engineers will be glad to make practical suggestions.

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(Begins on page 19)

160 **Radiant Heating Construction**—This 8-pp report concerns accepted installation procedures for radiant heating systems. Various types of construction are sketched, and each sketch shows position of wrought iron pipes in concrete slab, and relation of coils and slab to structural features of both on grade and above grade construction. Contained in a brief digest of construction recommendations are discussions of floor surfacing, heating slab, radial heating coils, insulation base or fill, waterproof membrane. A. M. Byers Co.

HOSE, ACCESSORIES

161 **Industrial Fire Hose**—This 4-pp illustrated data sheet reviews factors in the selection of hose for safety and long life, and offers operating tips and specifications on 11 types of fire hose for industrial use. Also describes a chemical treatment for hose, called Superseal, which protects against mildew, rotting, moisture absorption and freezing. The B. F. Goodrich Chemical Co.

162 **Hose Couplings**—Catalog 400, 28 pp, describes and illustrates the Flanco four-bolt split-flange coupling for high, medium, low and suction return applications. Covers high pressure two wire braid pressed-on hose assemblies, suction hose, spiral wire hose assemblies, stem angles and connector units, two and one wire braid clamp-type hose assemblies, low pressure two rayon braid hose and suction hose assemblies, and split-flange clamp-type couplings. Includes photos, drawings, dimensional data, and full specifications. Anchor Coupling Co., Inc.

163 **Hose Reels**—Catalog 5, 32 pp, features engineering data on company's line of industrial hose reels for air, water, oil, low and high pressure grease, paint spray, and industrial fluids. Design and construction details are described, and photos, drawings and full specifications are included. Ace Hose Reel Co., Ltd.

TOOLS, WELDING AND MACHINE SHOP EQUIPMENT

164 **Handy Fastening Tool** — Two booklets show different ways in which this fastening tool can be used. One booklet shows how the tool can be used for plant maintenance—fastening conduits, bus ducts, junction and outlet boxes, surface raceways, fixtures and frames, duct straps, fan and blower mounts, sprinkler pipes, partition plates. The second booklet tells how it can be used for lead lining. Tells how to line heavy wall steel tanks, thin wall steel tanks, wood tanks, concrete tanks and storage rooms. Also discusses general applications of lead lining. Olin Mathieson Chemical Corp.

The two Reader Service Cards on the facing page are easy to use, need no postage. Just circle the item number of bulletins wanted.

165 **Welding Facts Illustrated**—Described as a "picture book of facts on company's welding processes," 16-pp Form TIS 2367 provides helpful information on the "low heat input" metal-joining process. Explains how it combines advantages of low application heats of brazing with greater strength of fusion welding. Technical data tells how company's Low Temp EutecRods and Low Amp EutecTrodes minimize or eliminate residual stresses, cracking and distortion of base metals. Test reports are provided and several pages are devoted to case histories. Eutectic Welding Alloys Corp.

166 **Aluminum Brazing Data**—Practical shop data and new developments in brazing aluminum are presented in this 134-pp book. A brief history of brazing, and an explanation of the action occurring between filler metal, parent metal and flux are given. Descriptions of company's brazing materials, and considerations involved in designing, preparing and assembling brazed joints are detailed. Torch, furnace and dip brazing processes are covered. Chapters are devoted to specialized processes; brazing castings; brazing aluminum to other metals; performance of brazed joints; cleaning and finishing; testing. Answers to routine questions on methods and materials are included. Tables present data on composition and melting ranges of parent metals, filler alloys and fluxes; properties of brazing sheet. Available to qualified plant engineers—please state your job title. Aluminum Co. of America.

167 **Tap Guide Chart**—In this chart, 12 comprehensive quick-reference tables are arranged in an adaptation of calendar style for wall mounting. Tables include: tap pitch tolerances compared with NSTC and Unified Thread Class Fits 0-80 through 1½-12; tap drill sizes from 0-80 through 1-27 with basic thread dimensions; suggested tapping speeds; suggested lubricants; rake angles; decimal equivalents; tap terminology. The Wood & Spencer Co.

168 **Guide to Gages**—This 48-pp illustrated catalog contains specifications and prices on company's quality controlled gages. Fully indexed and organized in a convenient, sectionalized format with tables and pictorial product information, catalog includes data on plain cylindrical ring gages, plug gages, tapered plain plug and ring gages and master setting discs. Covers styles, gaging surfaces, size ranges, tolerance classifications and prices, as well as special gages. Practical gaging information such as wear allowance and gagemakers' tolerance charts, ordnance tolerance tables also included. Dearborn Gage Co.

169 **Manual on Gages**—Included in 112-pp Catalog G55 are 40 pp of engineering data, as well as illustrations and tips on ordering and using gages, and price data. Catalog covers company's cylindrical plug gages, taper gages and master setting disks, cylindrical ring gages, adjustable limit gages, thread gages, thread production and checking equipment and pipe thread gages. The engineering data section includes a chapter covering gaging policy, tolerances, care and use of cylindrical gages. A second part deals with thread gages and includes terminology, gage blank dimensions and a history of Unified Screw Thread System. A third part concerns itself with pipe thread gages and covers gaging practice, specifications for NPT, NPTF and ANPT threads, tolerances. Threadwell Tap & Die Co.

170 **Hold-Down Vise** — Ideas, illustrations and application photos that show how to save set-up time and increase production with the Hold-Down vise are presented in this 8-pp brochure. Shows how set-up problems of milling and grinding (non-ferrous metals) can be solved quickly. Illinois Metal Products.

171 **Vibration, Noise Control**—Bulletin K6A, designed as a guide to machinery mounting, vibration and noise control, discusses such problems as: machine mobility; eliminating floor bolts; leveling machines; eliminating rejects. Shows by means of case histories how these problems are solved by such isolation media as steel springs, cork, and rubber. An insert section features selector chart telling cost for 215 types used for open back inclinable punch presses. The Korfund Co., Inc.

CORROSION PREVENTION

173 **For Corrosion Proofing** — Provided in this 8-pp brochure on corrosion proofing materials and techniques is detailed information on cement mortars, interliners for masonry construction and protective coatings and linings for surface treatment. Tables and charts are included for selecting proper cement mortars and determining resistance to various corrosive conditions. Charts are also provided for use in selecting coatings and linings. Pennsylvania Salt Mfg. Co.

174 **Corrosion-Proof Cements**—Bulletin 5-2, 12-pp, describes the requirements of corrosion-proof cements and features technical data on five standard cements: furan, phenolic, sulfur, polyester and silica based materials. Application photos, properties and characteristics, tables of resistance characteristics, types of constructions of brick and cement, and other information is presented in this illustrated publication. The Atlas Mineral Products Co.

175 **Corrosion-Proof Materials** — Bulletin CC-3, 16-pp, gives basic information on company's corrosion proof construction materials, covering chemical and physical data, estimating data and descriptions of products used for acid proof installations in the metal working, chemical, petroleum, pulp and paper and other industries. Included are sections on corrosion proof cements, tank linings, protective coatings, rigid plastic fabrications and rigid plastic pipe, plus a chart showing their resistance to chemicals. The Atlas Mineral Products Co.

176 **Lining Compounds**—This "sampler" is a 3½ by 8½ in. folder carrying eleven actual specimens of rubber and elastomeric materials compounded, milled and calendered in company's mills. Specimens represent standard compounds used in the majority of corrosion and abrasion resistant lining work performed by company engineers and technicians on tanks, vessels, pipe, fittings, duct work, fans and other equipment. Automotive Rubber Co., Inc.

177 **Why Rubber Linings**—Described in this 8-pp bulletin are advantages and application of rubber lining to steel tanks, drums, pipes, valves, fittings and pumps. Includes tables giving corrosion resistance of company's rubber lining to inorganic acids, salts and alkalies, organic materials and many miscellaneous materials. Details on the chemical, abrasive and temperature resistant qualities of rubber linings and on the types of rubber linings available are also given. Metalweld, Inc.

New Ideas on Lighting, Communication Equipment

178 **Improved Lighting** — "Better Industrial Lighting with Mercury Vapor" is a 12-pp booklet devoted to showing how a plant engineer can improve seeing and working conditions at lower cost. Contains a summary of eight basic advantages of using mercury vapor lamps and shows ten typical applications of these lamps in industrial plants. Also provides a section on engineering hints for effective installations, as well as information on how to combine mercury vapor lamps with fluorescent or incandescent lighting. Sylvania Electric Products Inc.

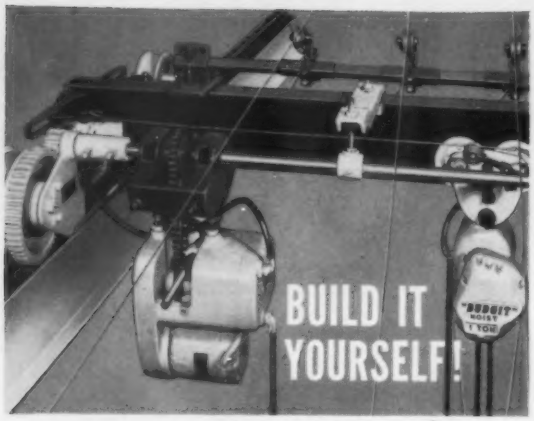
179 **Fluorescent Ballasts** — Twenty-pp Bulletin GEA 6249 on fluorescent ballasts contains descriptive information on the sound rating system, quality control, life expectancy, design features, of the ballasts; also development facilities and customer services of manufacturer. Explains and illustrates why these ballasts afford long-run economy. General Electric Co.

180 **Portable Lamps**—How these portable lamps light up dark areas and step up efficiency is pictorially described in Bulletin 5514. Typical applications are shown and various types and sizes illustrated. Day-Ray Products, Inc.

181 **Nylon Flashlights** — Advantages of heavy duty nylon flashlights are outlined in illustrated Bulletin RR-204. Stresses ruggedness, resistance to extreme temperatures and chemicals, and design features which make these flashlights well suited to industrial use. Ray-O-Vac Co.

182 **Industrial Signals** — Bulletin 100, 8-pp, summarizes use of modern visual and audible signals for industrial manufacturing plants. Covers history of signalling by man, basic principles of physics of sound, and an analysis on selection of right signal for the job. Cites three factors in selection —purpose to be served, areas to be covered, and noise levels to be overcome. Diagrammatic scale-model plan of a proper signalling system included, along with a signal selector wheel. Signal Div., Federal Sign and Signal Corp.

183 **Inside Telephone System** — "Ten Ways To Cut Costs With Inside Telephones" is a 12-pp illustrated booklet which tells how ten different organizations are saving money with P-A-X. Explains the role of this telephone system, separate from the public telephone service, in stepping up production, saving man hours, cutting costs, improving customer relations, and effecting further company benefits. Automatic Electric Sales Corp.



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Buy a 'Budgit' Geared-Type Bridge Crane Assembly and Electric Drive Unit from your "Shaw-Box" Distributor and get an I-beam and drive shaft locally. It takes about 4 man-hours to complete the bridge. No machining. No drilling. A wrench is the only tool needed. Next, install a 'Budgit' Electric Hoist, Trolley and Current Collectors on the bridge and you have a complete electric crane that saves time, effort and money. A push-button control, suspended from the Drive, starts and stops bridge travel.

Packaged 'Budgit' Bridge Crane Assemblies come in sizes to build ¼ to 6-ton single girder bridges in a wide range of spans; also to build 180° swinging jibs and push-type cranes. 'Budgit' Bridge Drive Units can be installed on any make of geared-type, hand-operated crane bridge up to 10 tons' capacity. *Ask your "Shaw-Box" Distributor for details or write us for bulletins.*

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'Budgit' ® CRANE ASSEMBLIES

MANNING, MAXWELL & MOORE, INC.
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Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

For more facts circle 646 on Reply Card

BULLETINS

(Begins on page 19)

WATER CONDITIONING

184 **Sub-Surface Washers** — Technical Reprint T-139, 8-pp, discusses development of the sub-surface washer, used in demineralizers, zeolite softeners and filters. Presents causes of fouling and problems encountered with actual installations in a variety of industries. A cut-away drawing showing features is included, along with flow sheets and a diagrammatic sketch of pilot unit observations. Graver Water Conditioning Co.

185 **Carbon Dioxide Measurement**—Technical Paper 133, 16-pp, discusses determination of CO_2 in water by conductivity measurements. Describes a new method developed for the determination of carbon dioxide which is applicable to analysis of waterside deposits, treatment chemicals and organic carbon in water. W. H. & L. D. Betz.

DUST HANDLING

186 **Dust Collectors** — Manufacturer's line of cabinet cloth filter and cyclone separator type dust collectors is pictured and described in 16-pp Catalog 39. Tells why dust collectors are essential to industry, how unitized collectors save money and how they can be used. Also includes list of operating and construction features, details of each model, accessories, optional equipment, selection information, specifications and descriptions of such applied products as exhausters and blowers. Photos show many typical installations of these dust collectors. Torit Mfg. Co.

187 **Power Sweepers**—Models 605 and 606 power sweepers are described in Form 427-1255, which gives full specifications for each. Application photos show sweepers in operation and a cutaway view points out important features. Wayne Mfg. Co.

OTHER EQUIPMENT

189 **On Moisture Control**—"Air, water and Industry" is a 20-pp pocket-size booklet covering some compressed air problems and how to solve them. Tells why there is moisture in air lines, how it got there, and why its action is destructive. Booklet is fast reading, cleverly illustrated and includes table of approximate air needs of air tools. A companion piece to this booklet is a revised bulletin describing the Vi-Speed method for removing moisture from air, hydrogen, nitrogen and natural gas lines. It includes model specifications, dew-point chart. Van Products Co.

190 **Washing Equipment**—Catalog 5601, 28 pp, illustrated in full color, shows a full line of group washing equipment and drinking fountains. Washfountains, bowls, showers, and accessories are covered. Book contains information on company's new "floating" type foot mechanism and counter type fixtures as well as data on comparative costs and advantages of group washing versus individual wash fixtures. Bradley Washfountain Co.

191 **Plumbing Maintenance Plan**—How to cut operating costs through company's plumbing maintenance plan is told in this fact-filled bulletin. Tells how to save on water, conserve fuel, reduce labor costs, and prolong fixture life. J. A. Sexauer Mfg. Co., Inc.

192 **Indexing Units**—Catalog 106, 24 pp, contains selection and application data on high speed indexing mechanisms available from stock. Included are methods of calculating load requirements, load ratings based on a minimum of 8000 hr without maintenance, and dimensions of stock and standard drives. Catalog also introduces a packaged power unit for indexing straight line assembly machinery. Ferguson Machine & Tool Co., Inc.

193 **Rubber Parts, Products**—In file folder form, this brochure describes company's facilities for producing custom-made rubber parts and components. Laboratory facilities, fabricating techniques are covered. Representative products are shown, including seals, O-rings. Goshen Rubber Co., Inc.

BULLETINS

(Begins on page 19)

194 Inert Gas Generators—Bulletin IGG-155, 10-pp, describes inert gas generators for protection against fire and explosion. In addition to detailed drawings, photos, capacity and dimension tables, book contains a useful information sheet. Includes an analysis of the work to be done by generators, operating conditions, utilities needed and other data needed for selection. Roots-Connersville Blower Div., Dresser Industries, Inc.

195 Sectional Condenser — Bulletin 130 shows benefits of sectional-design refrigeration condensers for 100 to 240 tons refrigeration capacity and explains their functions with diagrams and installation photos. A cutaway drawing shows component parts of this condenser. Niagara Blower Co.

196 Insulations, Refractories — This 20-pp catalog features company's thermal insulations and refractories for general industrial applications. Organized for quick reference, catalog provides information on composition, physical and thermal properties and sizes of the various products. Lists chief advantages, covers materials for efficient control of temperatures from —400 F to 3,000 F. Johns-Manville.

198 Stainless Wire—This bulletin includes the analysis, tensile strengths, physical properties and gages of 12 types of stainless wire most generally used in the manufacture of wire products. Specifications are given in chart form and each type is described in terms of distinctive characteristics and suggested end use. Entire group is broken down into austenitic, martensitic and ferritic classifications. Webb Wire Div., The Carpenter Steel Co.

200 Colored Templets—Shown in this bulletin are colored templets and continuous layout tapes developed to meet the need for a method of color-coding master layouts, as well as for production control charts and others. Illustrated in full color, bulletin includes prices, suggestions for use. Repro-Templets, Inc.

201 Identification Systems — Titled, "Six Honest Serving Men—the Dashew Story", this 20-pp brochure presents a detailed explanation of equipment for automated data processing on selfwriting metal identification tags and their applications for linking office/factory systems to control production, storage, inventory, shipping and receiving. Profusely illustrated with equipment photos and systems flow charts, the book describes the Databosser, Dashaplates and other writing and marking tools for implementing identification control systems. Dashew Business Machines, Inc.

202 Improved Crushers—Bulletin 12-C, 16-pp, describes company's line of crushers for reducing coal, coke, glass cullet, gypsum, lime, metal turning, sugar, sulphur and similar lump materials. Covers Knittel ring type crushers, two-stage double-roll crushers, single-roll crushers, and double-roll crushers. Photos, dimensional drawings and full specifications are included. Stephens-Adamson Mfg. Co.

203 Space Screens—This illustrated bulletin describes company's line of Wissco-loy space screens and includes listing of standard specifications as well as recommended applications and ordering suggestions. Wickwire Spencer Steel Div., The Colorado Fuel and Iron Corp.

204 Chemical Finishing—This 12-pp brochure contains information to help plant engineers find new ways to cut manufacturing costs through use of low-cost, treated base metals. Useful for design and reference, booklet describes aluminum anodizing and alodizing; surface conditioning, and various other types of conversion coatings obtainable on aluminum, magnesium, and steel. J. W. Rex Co.

205 Computing and Simulation—This 7-pp brochure explains services offered for all simulation, computing, data reduction and data processing operations. Written explanations are further clarified by descriptive diagrams showing flow of data. Tells how data is routed from problem analysis and preparation service to desired facility—analog simulation, digital computing and record reading, analog-to-digital conversion, digital-to-analog conversion. J. B. Rea Co., Inc.

206 Fabrication Facilities—Specialized manufacturing facilities for fabrication of pressure vessels, high pressure piping and unusual weldments, custom-designed to specification, are described in 18-pp illustrated Bulletin GS-56-4. Types of special equipment made at the plants described include reaction vessels, autoclaves, fat splitter towers, steam accumulators, nuclear power plant steam generator-heat exchanger vessel and towers. Foster-Wheeler Corp.

DATA FILE of literature for the plant engineer's library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided for you on pages 207-208.

MATERIALS HANDLING

301 Cranes for Big Jobs—A new 1½-yard shovel, 35-ton crane is described in this 6-pp catalog. Action pictures of the machine in quarries and gravel plants are included, also specifications. American Hoist & Derrick Co.

302 Electric Hoists—Twelve-pp Bulletin DH 133B describes Speedway electric hoists of 500- to 4000-lb. capacities. Fully illustrates and explains design features and gives details on suspensions and conductor systems. Clearance data, specifications included. Wright Hoist Div., American Chain & Cable Co., Inc.

303 Electric Hoist Manual—Catalog 215-B offers 38 pp of engineering, application and ordering information on company's Load-Lifter electric hoists. Presents hoists with hand operated trolleys and with power travel, hoists with lug suspension, hook suspension and push-type trolleys, and with hand-geared trolleys. Manning, Maxwell & Moore, Inc.

304 Manual on Electric Hoists — Catalog H-46, 40 pp, covers monorail and stationary hoists and car pulleys. Explains fundamental types of grabs, methods of hanging I-beams, types of hoist suspension, controls. American Engineering Co.

305 Overhead Cranes—Bulletin T202, 20 pp, gives full information on top running double girder cranes with top running trolley in capacities from 2 to 12 tons, spans to 60 ft. Data is also given on top running single girder cranes, both motor driven bridge types and head geared or push type in capacities from 1 to 10 tons, spans to 50 ft. Features which contribute to efficient operation and low maintenance costs are detailed. Several pages are devoted to electrical information. Chicago Tramrail Corp.

306 Crane and Hoist Parts—Bulletin G8 covers company's line of hoist grabs as well as component parts for various type cranes. Includes photos and drawings of the parts, along with descriptions and specifications. Downs Crane & Hoist Co.

307 Overhead Handling System—Engineering and application data on overhead handling equipment is presented in 12-pp Bulletin 2008-L.

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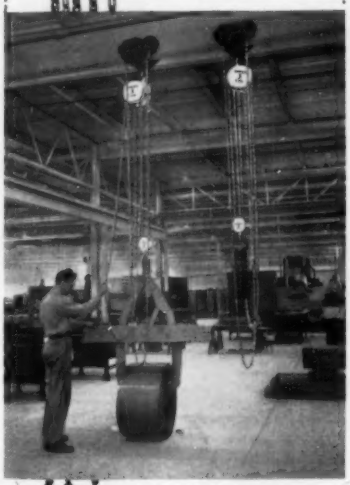

It is 'Budgit' — the light-weight aluminum chain block you can carry and use anywhere for "spot lifting." The smallest size weighs just 29 lbs. but lifts 500 lbs. with a hand chain pull of only 25 lbs. Operation is smooth, fast, safe. Every part — from over-capacity hooks to big "full-jeweled" brake — is superstrong.

For maintenance in the plant or outdoors . . . for equipment installation . . . for daily production jobs . . . choose the 'Budgit' Aluminum Chain Block. Highest efficiency and long service life make it your best buy in "knock-about" hoists. Capacities: ¼ to 10 tons. *Get details from your Shaw-Box Distributor or write us for Bulletins 398 and 415.*

AN I-BEAM TROLLEY adds travel-ability to any hoist. All types available. Capacities: ¼-ton up. Priced from $18.50. Write for bulletin.

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Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

For more facts circle 647 on Reply Card

DATA FILE

(Begins on page 211)

Describes stresses developed in various type tracks used for overhead handling systems. Problem of track peening and its solution is also covered. Data is given on principal components of systems. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

308 **Continuous Power Conveyor** — Sixteen-pp Catalog A-96 describes a packaged overhead conveyor for light duty applications. This complete basic "package" contains drive unit, take-up, oiler and other items essential for a 50-ft system. Describes power drive unit, track, power chain and other components and discusses lubrication and chain safeguards. Suggested layouts are diagrammed, and some installations of these conveyors are illustrated. Richards-Wilcox Mfg. Co.

309 **Trolley Conveyors**—Continuous overhead conveyor systems are featured in profusely illustrated, 132-pp Catalog 50. Describes outstanding advantages such as adaptability, self-programming operation, automatic timing, space saving storage, adequate supply of parts, worker conservation, assembly on the conveyor and others. Dimensions and data on various types of trolley and attachments are given. Jervis B. Webb Co.

310 **Engineered Conveyor Systems**—Catalog 853, 32 pp, illustrates conveyor systems in use in a wide range of industries, showing how they suit handling requirements involved. Roller, wheel, belt, chain, overhead trolley and elevating conveyors are included, also spirals, portable power conveyors, ball transfers and special equipment. Mathews Conveyor Co.

311 **Roller Conveyors**—Catalog 60A, 20-pp, contains engineering data on medium and heavy duty roller conveyors, including specifications and capacities on rollers and bearings. Heavy duty mobile unit for straight sections of roller conveyor is illustrated, also roller curves, spur sections, sliding switches, converging sections, vertical lift and horizontal gate sections in permanent and portable types. Installation views are included. The E. W. Buschman Co.

312 **Conveyor and Elevator Belting Tips**—This 32-pp manual on installations, maintenance and care of conveyor and elevator belting, uses photos and drawings to show ways to improve belt service and lengthen belt life. Includes a discussion of belt design, covers, reinforcements and grades. Repair methods, splicing, and fastenings are also covered, and there's a table listing common conveyor belt maintenance problems. The B. F. Goodrich Co.

313 **Metal Conveyor Belts** — This 24-pp booklet is an illustrated guide to selection of metal conveyor belts. Presents both conventional and balanced spiral weave belts; covers raised edge and flight constructions, chain edge construction, high temperature belts, wire conveyor aprons. Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp.

314 **Engineered Conveyors**—Bulletin 156, 8 pp, discusses design and performance of company's material handling and production systems, engineered to solve specific problems in the handling and production of various materials. Covers overhead conveyors, ultra time and synchronized conveyors, trans-free conveyors, TV tube settling conveyors, pig stacker, others. Allied Steel and Conveyors Div., The Sparks-Withington Co.

315 **Materials Handling Methods** — Bulletin 552, 16-pp, illustrates 48 manhour and space-saving handling operations, and shows various material handling equipment at work in many industries. Shows how properly selected equipment gets more work done and reduces costs by making handling jobs easier. Describes general materials handling movements, motor truck loading and unloading, storing goods and materials ceiling high, handling skids and pallets with the same lift truck, many other applications. Barrett-Cravens Co.

316 **Lift Truck Work Kit**—A method of predetermining the time necessary for fork lift trucks to perform specific operations is provided in this work kit, designed to enable plant engineers to apply fork lift truck standard performance data. It can assist in determining efficiency of fork lift trucks now in use as well as in planning for future needs. Includes typical materials handling examples to show technique for application of the data, as well as charts providing times for basic truck motion elements. The Yale & Towne Mfg. Co.

317 **Fork Truck Efficiency Test**—This 8-pp article explains how to tell when fork trucks need corrective measures. Lists equipment and facilities necessary for truck testing, tells how to test traveling efficiency and hoist speed measurements, shows suggested test data forms. Mercury Mfg. Co.

318 **Oil-Hydraulic Lifts** — Catalog RE-203, 20-pp, covers the field of heavy-duty oil-hydraulic lifting devices for industrial applications. Featured in catalog are company's standard Levelator lifts, a 6000 lb single-jack model and a 12,000 lb dual-jack lift. Also featured is an electric pump mounted on an oil tank for powering oil-hydraulic devices. Illustrates lift platforms, platform accessories and safety devices, jacks, power units. Rotary Lift Co.

319 **Adjustable Ramps**—Engineering details and other information on use and installation of company's hydraulic adjustable ramps for loading docks are featured in this illustrated bulletin. Two types of dock equipment are treated—the Adjust-A-Dock, installed in the loading platform or at its level, and the Adjust-A-Truck, installed at ground level to raise or lower rear wheels of truck. Rowe Methods, Inc.

320 **Shock Absorbing Casters** — Twenty-pp Catalog FH-53 describes construction features of company's Floating-Hub casters, listing types and mountings now available. Load ratings for each type and size are provided. Stresses, by text and illustration, how these shock absorbing casters work, permit smooth travel over rough floors. The Bassick Co.

321 **Casters and Wheels**—Catalog 138 is a 191-pp product manual on company's line of casters and wheels, describing design features and listing full specifications. Photos and drawings are used profusely to illustrate data, covering furniture casters, wheels, glides, desk shoes and various accessories. Darnell Corp.

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Saves
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- up to 30%* on labor**

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See the equipment in the foreground? It's a circulating type of paint heater. Using this or any other standard type of hot spray equipment, Tygon ATD Hot Spray Vinyl Paint builds a 5 mil high-solids film in just two passes of a spray gun, with good edge build up — without runs or sags. No thinner is needed, heat at 160°F. replaces solvents. The dried vinyl film is dense, tough, tightly adhering, with a smooth, glossy surface. Corrosion resistance is excellent.

****Saves up to 20% on materials** — There is very little loss through overspray — no thinner is needed — partially used material will not harden or skin over.

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PLASTICS AND SYNTHETICS DIVISION

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*ADHESION • THICKNESS • DENSITY 192E

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DATA FILE

(Begins on page 211)

STORAGE EQUIPMENT

322 **Storage Equipment**—Catalog 100-E, 72-pp, illustrates and describes company's complete line of steel cabinets, folding chairs, chests and safes, stools, tool boxes, work benches, tool stands, shelving, tool storage, lockers, coat racks, filing cabinets, revolving bins, others. Includes dimensions and other specifications. Photos illustrate some typical equipment installations. Lyon Metal Products, Inc.

323 **Adjustable Shelving**—How this shelving can save assembly time is explained in 28-pp Form 2111. Photos and drawings of various types of shelving units, including open and closed shelving, bin units, ledge shelving, counter shelving, cabinets with swinging and sliding doors, parts and accessories, are included, along with specifications. Standard Pressed Steel Co.

324 **Storage Shelving**—Rapid erection, strength and other advantages of manufacturer's storage shelving are stressed in this illustrated bulletin. Shows component parts, open types, closed types and some of the many combinations of dividers, bins, doors available. Also presents tool inserts, other shop equipment. DeLuxe Metal Furniture Co.

325 **Steel Shelves**—Catalog S-300, 20-pp, features a line of adjustable, interchangeable steel shelves, describing typical installations, flexibility in shelving arrangement and other advantages. Various types of units are shown and specifications are given. Penco Metal Products Div., Alan Wood Steel Co.

MAINTENANCE

326 **Building Maintenance**—Handbook 7 offers 64 pp of information on floor surfacing, leak stoppers, external wall sealants, roadpatching, roofing materials. Includes instruction for applying them. Flexrock Co.

327 **Basic-Roofing Information**—"What You Should Know About Your Roof" is a 40-pp clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of a good re-roofing job, also special features of company's roofing materials. Johns-Manville.

328 **Protective Paints**—Details on a rubber-base paint formulated to afford increased protection against corrosion from acids and alkalis and especially applicable for use on concrete, are provided in this literature. These finishes are also suggested for wood and metal. Cellulose Products Dept., Hercules Powder Co.

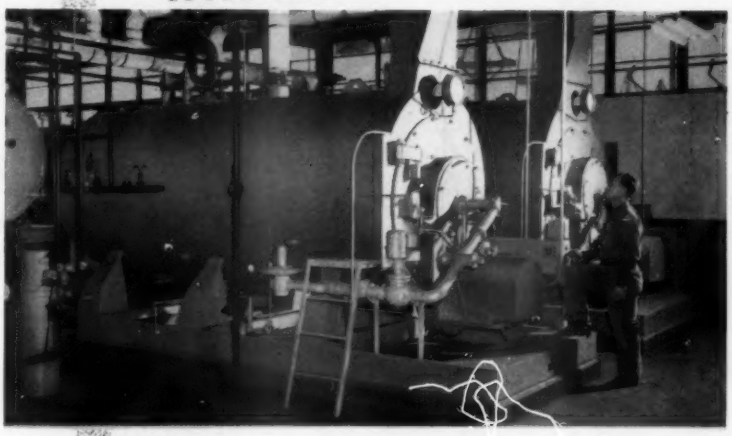
329 **Hot-Dip Galvanizing**—How hot-dip galvanizing is prolonging life of industrial equipment is stressed in this 16-pp booklet. Photos, showing galvanized equipment in use accompany brief text explaining how this process of covering iron and steel with a protective coating of zinc serves to prevent rust. The galvanizing procedure is explained and illustrated. Coating comparison charts show how hot-dip galvanizing compares with other types of coatings as to rust resistance, dimension limits, shock resistance. American Hot-Dip Galvanizers Assn., Inc.

330 **Better Floor Care**—This illustrated folder describes products designed to aid efficient floor care. Lists combination scrubber-vac machines, conventional scrubbing-polishing machines, steel-wool pads, applicators, vacuum cleaners, mop trucks and other mopping equipment. Included are waxes, sealers and cleansers. Finnell Systems, Inc.

331 **Cleaning Problem Solutions**—Illustrated Bulletin 154, 12 pp, presents information on a wide range of cleaning methods and shows equipment available. Special emphasis is placed on the stationary vacuum cleaning system and its long-run economy in many installations. The Spencer Turbine Co.

332 **Blower-Suction Cleaner**—Data on a portable combination blower suction cleaner for cleaning machinery motors, stock bins are of-

THERE'S $5,949.81 WORTH of READING IN THIS STORY CYCLOTHERM WROTE!



Too high—said the Zion Cooperative Mercantile Institute, Salt Lake City, of its 1953-1954 heating costs. ZCMI is the largest wholesale distributor in the intermountain area.

So ZCMI installed two Cyclotherm Steam Generators (150 and 250 hp). And from October, 1954 to June, 1955, even in a colder winter and with additions to the ZCMI plant, Cyclotherm saved ZCMI $5,949.81.

For full information on how ZCMI saved money with Cyclotherm—together with a month-by-month before-and-after table of ZCMI's heating costs—write to Cyclotherm today. You'll join the thousands of satisfied Cyclotherm users who report *more heat with less fuel.*

In Cyclotherm Cyclonic Combustion, air combines with fuel to form a vortex of flame, revolving at 200 miles per hour, providing maximum heat transfer. Cyclotherm is a complete package steam or hot water generator, 5 connections make it ready to work. From 18 to 500 hp, 15 to 200 psi. Meets all state requirements, A.S.M.E. and National Board Standards, is approved by Underwriters Laboratories, Inc. Write for complete booklet on Cyclotherm Cyclonic Combustion today.

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These versatile Chromalox Tubular Heaters provide the kind of heat you need, exactly fitted to your specific heating application.

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DATA FILE

(Begins on page 211)

fered. Describes models available, attachments for many cleaning jobs. Clements Mfg. Co.

333 Brushless Suction Sweeper—Dust control features and advantages of using company's floor-type vacuum for large floor areas are presented in this illustrated bulletin. Describes operation, points out typical applications and includes dimensions and specifications. Handling Devices Co., Inc.

334 Safety Solvent—Cleaning of motors and generators, and other equipment, quickly, efficiently and safely, with company's detergent-action safety solvent is detailed in illustrated Bulletin A-28. Describes uses in industry, and includes graphs showing evaporation cycle, optimum evaporation rate. Turco Products Inc.

CONSTRUCTION

335 Aluminum Building Products—Form AD 285 is a 32-pp 1956 catalog covering company's line of aluminum industrial building products. Cites advantages of aluminum, pictures some installations. Installation data, weights, dimensions and roughing-in details are provided on corrugated roofing and siding, V-beam roofing and siding, ribbed siding sheet, perforated corrugated sheet, flat flashing sheet. A discussion on sandwich wall system is presented. Accessories and fasteners are also covered, and suggested specifications included. Aluminum Co. of America.

336 Panel Wall Construction—The advantages of company's M-Type Q-Panel walls are outlined in 12-pp Bulletin Q-35-55. Includes installation photos, diagrams, specifications, as well as drawings pointing out structural details. H. H. Robertson Co.

337 Glass Block Fenestration—The natural ventilation characteristics of glass block fenestration are presented in this illustrated report of a test project. In some 88 pages, report covers sun hoods, window types, dual outlets, air speeds, double loaded variations, reverse draft, and ventilation below the window sill. Test data is summarized and recommendations included. Kimble Glass Co.

338 How to Glaze with Plexiglas—Sixteen-pp Booklet PL-23 gives detailed information on glazing industrial and other buildings with flat panels of the acrylic plastic Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems. Gives properties and behavior of this sheet. Plastic Dept., Rohm & Haas Co.

On pages 207-208 are two postage-free Reader Service Cards provided for your convenience in ordering these catalogs. You may also use the cards to order any literature mentioned in ads.

339 Fiberglass Reinforced Panels—This file of bulletins covers fiberglass-reinforced panels for a wider range of industrial glazing jobs. Data is provided on shatterproof panes, Fire-Snuf panels, and metal-reinforced security panels. Strength test reports and physical data as well as information on light transmission qualities are included. Resolite Corp.

340 Glass for Industrial Use—How glass is used and how to choose the proper type for the application are covered in 12-pp Catalog 56-1. Discusses glass according to function; light diffusion and glare reduction; decoration; protection; and heat absorption. Photos showing various finishes and typical installations are provided, along with performance data, selection and installation tips, light transmission ratings and other data. General advantages offered by company's line of glass are also detailed. Mississippi Glass Co.

more air - less horsepower . . . .

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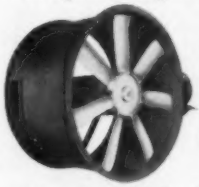
7-blade
semi-pressure
fans

Especially effective against resistances to 4" static pressure, new Aerovent "SP-7" Fans offer increased operating efficiency and economy — *without* "special" equipment or costly modifications.

The secret? It's the design of the new 7-blade "Macheta" Airfoil Propeller. Designed to move *more* air at *slower* speeds. The wider, heavier-sectioned blades permit the use of lower-horsepower standard construction motors. Result: lower initial cost and reduced operating expense.

direct connected and extended shaft types

Standard assemblies with "industry's most efficient air-moving surface," now available in sizes 14" to 60" in a wide range of speeds and capacities for all installations and operating characteristics. Also supplied with square steel panel orifices.



direct-driven and belt-driven duct

High-velocity units for all industrial air-handling requirements — exhaust, air supply, heat transfer and air-conditioning systems. Available for all hazardous and non-hazardous applications involving fumes, dusts, heat and vapors. Sizes 14" to 60".

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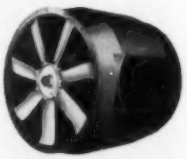

New "divided-duct" fan which combines the advantages of belted and direct-driven units. Sizes 18" to 48". Consult your Aerovent representative or write the factory direct for specific ratings and detailed performance data on fans for any air-moving problem.

All Aerovent Fans are rated in accordance with the Standard Test Code and conform to U.S.D.C. Commercial Standard CS 178-51.

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For more facts circle 651 on Reply Card

DATA FILE

(Begins on page 211)

341 **Safety Gratings**—Increased efficiency and safety are described as chief advantages of company's safety gratings featured in 16-pp Catalog BC-3. Describes various types of gratings, includes size and price data, and is illustrated with photos and drawings showing construction and typical applications. Bustin Steel Products Inc.

342 **Non-Slip Flooring**—Algrip, an abrasive rolled steel floor plate described as non-slip even on steep inclines, is the subject of Booklet AL-29, 8 pp. Discusses safety features; gives fabricating data. Alan Wood Steel Co.

343 **Steel Grating and Treads**—Bulletin 2486, 16-pp, describes types, sizes and load characteristics of company's line of electroforged steel and interlocked aluminum grating and treads. Points out advantages in design and construction resulting in greater safety, pictures applications, and includes specifications; photos and diagrams. Blaw-Knox Co.

344 **Metal Grating Handbook** — Sixteen-pp Form 500 is data and specification manual covering all types of grating, open steel floor armor, stair treads, vessel liners, decking and drain grates. Contains safe load tables for basic types of gratings, panel width constant charts, tables on standard widths and types of steel treads, types of anchors used for grating. Klemp Metal Grating Corp.

345 **Brick Floors**—Advantages of brick as a floor material are pointed out in this illustrated bulletin, 3h/Dr. Stresses such qualities as handsome appearance, excellent sanitary properties, resistance to acids and alkalies, durability, easy cleaning. Application photos included. Drehmann Paving and Flooring Co.

DUST CONTROL AND AIR CONDITIONING

346 **Dust Control, Blast Cleaning**—Bulletin 1210, 24 pp, fully illustrated, describes manufacturer's line of blast cleaning and dust control equipment, accessories. It is indexed according to equipment, type and purpose. Lists three methods of application. Pangborn Corp.

347 **Dust Control** — "Engineered Efficiency in Dust Collection and Recovery," 36 pp, discusses industrial dust recovery from standpoint of nuisance abatement, waste avoidance, hazard elimination. Shows effect of variation in particle size, distribution and specific gravity of dust on efficiency of the dust collecting system. Buell Engineering Co., Inc.

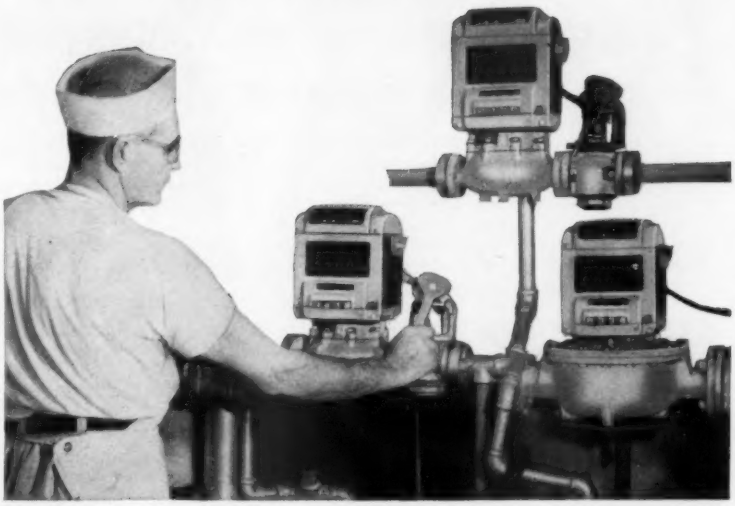
348 **On Dust Collection**—Specifications and descriptive details about company's Hydro-Filter are contained in 12-pp Bulletin 55. Tells how unit uses filtering principle to trap dust by impingement on glass spheres; entrapment on bubble surfaces and containment within water droplets. Separating efficiencies, application data, construction and design, as well as a description of models, capacity range available are included. National Dust Collector Corp.

349 **Tubing for Many Jobs** — Flexible tubing for ventilation, fume and dust removal as well as materials handling is described in 8-pp Catalog C2-4. Gives detailed information on company's Spiratube A and Spiratube R, two types of lightweight tubing made from continuous helical coils of spring wire wound with fabric. Gives uses. Flexible Tubing Corp.

350 **Manual of Exhaust Hood Design**—Bulletin 270-E1, 24 pp, features engineering data on dust control systems for the metal working industries. Illustrates and discusses the design of exhaust hoods for many operations in this field. Also, 61 photos of dust control installations show various methods of hooding dust source. American Air Filter Co., Inc.

351 **Dust Control Systems**—Valuable engineering data on methods of dust control as well as descriptions of company's line of dust collectors are contained in illustrated Bulletin 636-2. Specifications on all models are included. A special section tells how to design your own system. Aget Mfg. Co.

Three Neptune Meters Boost Production 200%



Less than half a minute of a man's time is required to measure three ingredients . . . corn syrup, liquid sugar, and water . . . into each batch of Nalley's table syrup. The operator simply pushes buttons on the Neptune Auto-Stop meters to set the pounds required by the formula, and opens the valves. The Auto-Stops shut off automatically . . . accurately . . . leaving the operator free to devote full attention to other details.

One man now produces more than three times as much as formerly was produced by five men handling bulk sugar and barreled corn syrup.

Ask for helpful Meter Selection Book **566SPE**

This Auto-Stop batching meter is only one of many models and sizes of Neptune meters . . . ranging from meters with simple counters to electric switch adaptations and remote control systems . . . now handling more than 150 different industrial liquids. Sizes from 25 to 1000 gpm. Bronze construction. Telephone or write nearest branch for full details.

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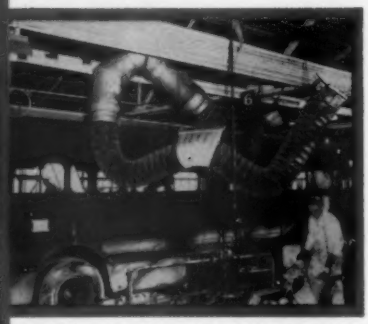
This cooperative, highly flexible ducting will save you time and money! If your operations require handling of air or gases, or removal of dust and fumes, or if you're moving materials that can be handled by blowing, suction or gravity, check with our engineers on the many things that Spiratube can do for you.

This lightweight, coated ducting "springs to work," because of its patented pre-formed helical wire construction — stays extended even on tight turns without loss of efficiency.

New machines can be located or floor plans changed without complicated changes in rigid ducting systems — Spiratube flexes and bends to meet the outlets.



Rugged Spiratube goes to the work — work doesn't have to be moved to a fixed duct opening! Here, Spiratube is used to remove welding and painting fumes.

Light, readily portable Spiratube goes into tanks and vats, exhausts dangerous fumes rapidly, so that men can work at cleaning inside. Saves hours on this job!

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Title and Company_____
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DATA FILE

(Begins on page 211)

352 **Dust Filter**—Advantages offered by company's type RJ dust filter are listed in Bulletin 560. A cutaway view points out construction details and table lists capacity ratings. The Day Co.

353 **Air Conditioning Filters**—Bulletin 600, 8 pp, describes company's Staynew ventilation and air conditioning filters. Specifications, engineering, performance and installation data covering dry type panel filters for the removal of air-borne impurities given. Dollinger Corp.

SPACE, PROCESS HEATING

354 **Unit Heaters**—Bulletin 7517, 48 pp, presents full information on latest design of this company's Venturafin unit heaters for steam or hot water applications. Gives features of construction, general engineering data, capacity tables. Fully illustrated with photos of horizontal and vertical models, dimensional drawings and piping diagrams, booklet includes tips on the use and selection of unit heaters. American Blower Corp.

355 **Plumbing, Heating Supplies**—Edition H is the current edition of this company's 126-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and generously illustrated; gives sizes, intended uses. J. A. Sexauer Mfg. Co., Inc.

356 **Forced Air Space Heaters**—Illustrated Bulletin 523-B, 12-pp, is devoted to a line of forced air heaters for comfort heating, year-round ventilating, tempering make-up air, process drying and heat curing. Explains design efficiency, construction details, operating principles and flexibility of application. Advantages of the heater are detailed. Dravo Corp.

357 **Electric Heating Units**—Catalog 50, 50-pp, contains complete engineering data on electrical heating units and equipment, including strip elements, finstrip elements, tubular elements, cartridge elements, ring elements, immersion heaters, circulation heaters, radiant heaters, forced air duct heaters, unit heaters, hot plates and others. Includes photos, dimensional drawings, price and standard rating tables and other specifications. Edwin L. Wiegand Co.

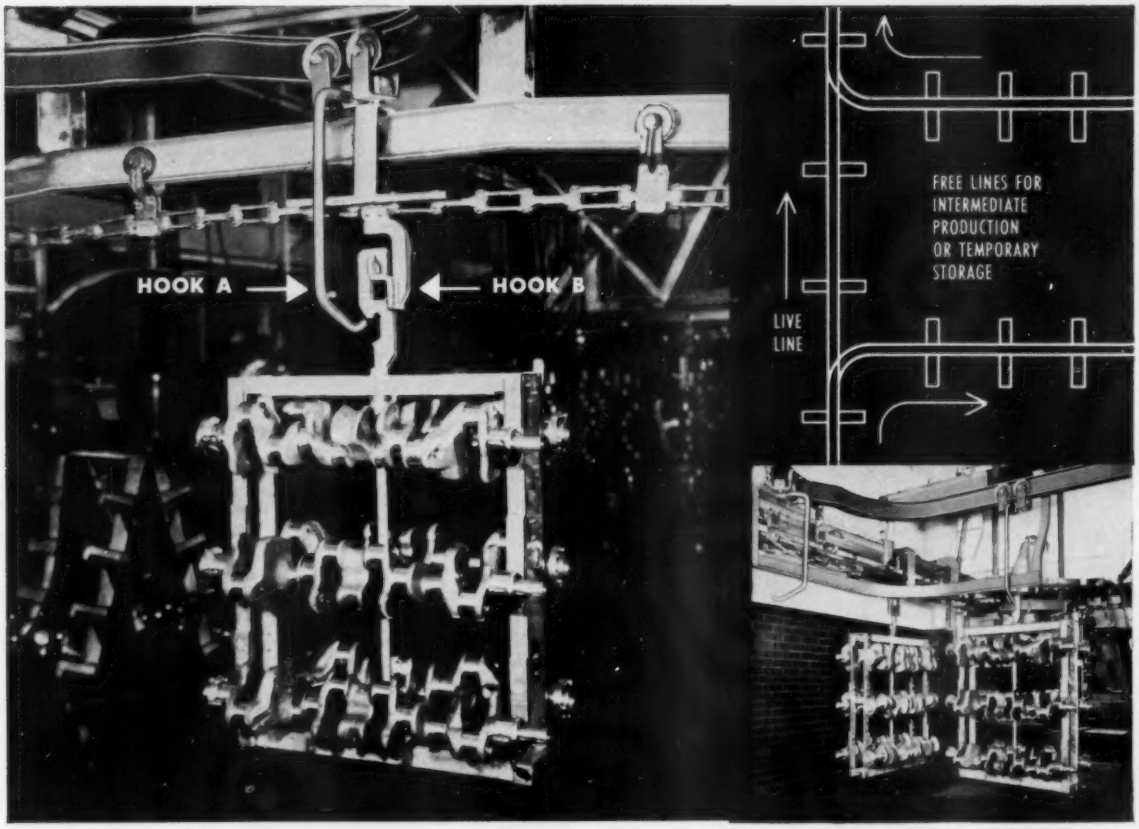
358 **Unit Heaters** — Catalog 155, 32 pp, presents unit heaters for steam and hot water in vertical and horizontal delivery and power-throw types. Covers design features and provides performance and capacity data. Also provides information on unit heater selection, sound ratings, locating unit heaters, motor wiring and control. Piping and installation suggestions are included as well as typical unit heater specifications. Modine Mfg. Co.

360 **Hot Water Heating Systems**—Catalog GK-954, 24 pp, features a complete line of equipment for forced hot water heating systems and chilled water cooling systems. Nine pages are devoted to information on a complete line of circulating pumps for dozens of applications. All-bronze pumps for circulating service water and silent operating centrifugal pumps for boosting water pressure are a few of the new applications. Valves, fittings, air vents, air tanks and water heaters are also described in detail. Bell & Gossett Co.

361 **Industrial Ovens** — Thirteen types of company's Conventioneered ovens, which apply principles of forced convection heating to various industrial processes, are illustrated and described in 12-pp Bulletin 200. These ovens serve foundries, metal finishers, plastics producers. The W. W. Sly Mfg. Co.

BOILERS, GENERATORS

362 **Packaged Boilers**—This 16-pp illustrated catalog describes manufacturer's new Type VP Package boiler. Following a section of background information is an outline of principal design features of these boilers, which are shop assembled and provide steam capacities from 4000 to 40,000 lb per hour. Space requirements are shown in a table along with specifications. Combustion Engineering, Inc.



Unloading from the power line to the free line is accomplished simply and quickly when loading hook A engages with hook B automatically. Parts are engaged with the power line without danger of collision with incoming loads by simply reversing the disengaging principle.

Now - completely trouble-free automatic transfer from live line to free with Allied Conveyors' TRANS-FREE Principle

Nearly every conveyor line requires, at some point, the transfer of racks or parts from a continuous power driven conveyor line to an auxiliary free line. In the past, this transfer could be accomplished only with a highly complicated system which was expensive to install and equally expensive to maintain.

Now, Allied Conveyors' Trans-Free (patent pending) can perform the job automatically at any point in the system without complicated electrical gadgets —with virtually no possibility of breakdown—and with practically no maintenance expense. This Ailied Conveyors' installation automatically selects any given unit load and transfers it from a continuous power driven line to an auxiliary free line. These free lines can be located at any point adjacent to the live line where intermediate production operations are to be performed or inventory is to be temporarily stored. When the part is required, it is automatically transferred back to the live line. The system is entirely automatic and compietely interlocked to prevent colliding of incoming and outgoing loads.

Trans-Free is one of the many reasons why more and more manufacturers are turning to Allied Conveyors for the kind of engineering ingenuity which will lower unit costs and speed production.

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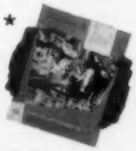

Whether your production needs involve modernization of present equipment or the design and engineering of an entire new conveyor system, you will find many useful ideas in this new booklet by Allied—*Conveyor Systems Case Histories*. Write for it today.

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Belt Conveyor Idlers:

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"This conveyor carries the product of the primary crusher set at about 5', on a 12 degree slope and running at about 450 feet per minute. Originally designed for 400 ton per hour capacity; there have been surge loadings of twice this amount.

"While the balance of the conveyor system is the enclosed gallery type; the No. 1 slope conveyor was not fully completed before the start of production season and consequently ran all year exposed to all kinds of weather.

"The Limberollers have carried a few hundred thousand tons of heavy stone with absolutely no maintenance. On the basis of this record we have placed repeat orders."

Richard Robinson

Richard Robinson, Treasurer
MASSACHUSETTS BROKEN STONE COMPANY

LIMBEROLLERS, at work on conveyor at Massachusetts Broken Stone Company.

The Joy Limberoller resists dust, abrasion, corrosion and material buildup. Resilient discs on a flexible steel cable conform to load and cushion the belt. Only two bearings are used and these are up out of the dirt zone. Get details from *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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DATA FILE

(Begins on page 211)

363 Steel Boilers—Revised General Catalog 80, 32-pp, is a condensed but complete product guide on company's high and low pressure steel boilers. Also included are full descriptions and illustrations of water heating products, both direct fired and storage types as well as indirect water heating coils. Pages on boiler support brackets, structural steel suspension and induced draft fans, as well as pictures of installations are included. Kewanee-Ross Corp.

364 Standard Generators — Bulletin B-55-4 describes company's SC economy series of standard steam generators designed to reduce steam costs for industrial plants. Pre-engineered, standardized steam generators offered in nine sizes, with capacities of from 50,000 to 150,000 lb per hour are described, and schematic and cutaway drawings of the units and design features are included. Foster Wheeler Corp.

365 Water Tube Boilers—This 12-pp bulletin describes and illustrates various types of water tube boilers and auxiliaries, including water cooled furnaces, superheaters, economizers, air preheaters, and steam washers. Also contains diagrams, tables, and boiler data. Edge Moor Iron Works, Inc. Div. of Condenser Service & Engineering Co., Inc.

MECHANICAL POWER TRANSMISSION

366 Sprockets and Chain — Bulletin A-624 24 pp, is compiled to provide plant engineers with all data required for selecting and ordering roller chain and sprockets. Devotes a page to Taper-Lock sprockets for each size of chain from 40 to 100, giving sectional drawing, dimensions, number of teeth, maximum stock bore available, weights, prices and other data. Another page covers Taper Lock bushings; and full information is given on riveted and cotter-type roller chains. Dodge Mfg. Corp.

367 Roller Chains, Sprockets—Catalog 754, 64 pp, describes, illustrates a line of roller chain stock sprockets, including minimum bore sprockets for reboring, also finished bore and Taper-lock bushed sprockets which are ready to use. Tables show speed ratios for sprocket combinations, standard keyways and setscrews. Includes chain selection and application data, installation and lubrication recommendations, chain length calculations, dimensions and price lists for single and multiple strand roller chains. Diamond Chain Co.

368 Power Transmission Equipment—Form 118, 24 pp, gives descriptive and technical information on variable speed pulleys, wide V-belts, sheaves, motor bases, countershafts, and Select-O-Speed transmissions. Illustrated with photos and dimensional drawings, booklet provides ratings, sizes, application and installation tips. Lovejoy Flexible Coupling Co.

369 Flexible Couplings — Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings for power transmission. Tells advantages of these couplings and discusses design principles. Double-flexing and floating shaft types, light duty couplings and types for special applications are described and pictured in detail. Thomas Flexible Coupling Co.

370 Fluid Couplings—Bulletin 144-D, 14-pp, presents complete installation and performance data on fluid couplings. Illustrated with diagrams and drawings, bulletin shows ease of applying company's fluid couplings on any type industrial equipment, powered by any type electric motor or internal combustion engine from ¾ to 850 hp. Describes standard models providing standard input, output combinations, and standard models in packaged units. Installation hook-ups are given, along with typical applications. Twin Disc Clutch Co.

371 Adjustable Speed Drives—Bulletin PB-4700-1 describes company's packaged adjustable speed drives—covering latest developments in design and construction. Tells how these packaged, pre-wired, pre-assembled units provide flexibility of d-c motor performance from an a-c power supply, and offer simple, convenient speed adjustment without intermediate speed changing equipment or line shafting. Crocker-Wheeler Div., Elliott Co.

TOOLS, WELDING, AND MACHINE SHOP EQUIPMENT

372 Portable Electric Tools — This 1955 Standard Catalog, Form 10, 24 pp, features company's line of portable electric tools, including electric drills, bench-drill stands, hole saws, buffing and polishing kits, sanders, polishers, grinders, hammers, saw blades, vacuum cleaners, and others. Photos and full specifications included. The Black & Decker Mfg. Co.

373 Data for the Shop—"Fluids and Facts for Metal Working" is a pocket-size booklet of about 44 pp. A section on metal working fluids covers their function and selection, preparation and use of soluble oils and paste compounds, and prevention of dermatitis. A section on metal working facts gives conversion tables, steel numbering systems, machinability ratings of metals, drill grinding charts, twist drill sizes and other data. Standard Oil Co. (Ind.)

374 Pipe Tool Ordering Guide—Catalog 2-51, 8 pp, covers company's line of threaders, cutters, vises, dies, tongs and wrenches; gives prices. Armstrong Bros. Tool Co.

375 On Spot Welding—"Spot Welding from One Side—With a Portable Gun," 12-pp, describes an inert-gas-shielded tungsten-arc spot welding process. Over 30 tables, weld cross-section and application photos, drawings and graphs are included. Sections of text cover when to consider spot welding from one side, how the equipment operates, standards and test procedures, factors affecting weld. Air Reduction Sales Co., Div., Air Reduction Co., Inc.

376 Where to Use Your Stud Driver—Twenty-pp pocket-size Form 955 describes and pictures applications of studs, using company's Model 450 stud driver. Provides some operating hints and safety precautions and covers use of studs through steel into concrete, wood into concrete, wood into steel and steel into

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Airco Stainless Steel Rods. These rods are used principally in welding base metals of the same analysis. To a limited degree that may also be used for welding high strength and hardenable steels when such steels cannot be pre- or post-heated for welding. Stainless steel rods can also be used as filler metal in oxyacetylene welding.

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DATA FILE

(Begins on page 211)

steel, as well as their use for attachment of pre-drilled fixtures. Remington Arms Co., Inc.

PUMPS, COMPRESSORS

377 For Hazardous Liquids—Catalog Section D, 12 pp, presents company's line of Underwriter rotary pumps for hazardous liquids. Both mechanical seal and deep stuffing box models are shown and dimensions and specifications provided. Various mounting arrangements and drives available for these UL approved pumps are also cataloged, and application suggestions are given. Also in this booklet are performance graphs. Viking Pump Co.

378 Steam Pump—Bulletin 230 describes a horizontal duplex steam pump with piston valve steam chest. Explains advantages of this construction, including high recovery of fuel cost when exhaust steam is utilized. Provides sectional and exterior views of the pump, also specifications, capacities and dimensions. Warren Steam Pump Co., Inc.

379 Sump Pump Selector—Bulletin 54-3-1420, 20 pp, provides a selection table allowing a plant engineer to choose any of the 4000 models of the BJ Sumpmaster pumps, which range from 10 to 2600 GPM with heads from 20 to 300 ft. Includes complete dimensions and outline drawings, simple coding system for ordering. Byron Jackson Co.

380 For Abusive Pumping Jobs — Catalog 4906, 36-pp, covers centrifugal pumps for wide, industrial use and especially adapted to handling ashes, abrasive mixtures, slurries, hot and corrosive liquids. It describes several basic types: a horizontal shaft, single-stage side suction pump; a horizontal shaft, single-stage, rear-entrance automatic priming pump; vertical shaft pumps with standard, overhead and quill bearings for wet pit applications. Nagle Pumps.

381 Wet Pit Pumps — Sixteen-pp Catalog 3007 covers heavy-duty pumps for drainage, flood water, effluent boiler blow-off, hot wells, acids and alkalis. Illustrations, tables and text give design features of these wet pit pumps. Catalog also includes a condensed version of the Standards of Hydraulic Institute data section listing metals used in constructing pumps for handling various liquids. Also suggests factors to be considered in pump selection. Yeomans Brothers Co.

382 Compressor Data — Feather valve compressors from 75 to 350 hp are described in 32-pp Bulletin L-676-B1A. Advantages on installation, operation and maintenance costs are outlined for types YC and DYC compressors. Information and illustrations are offered on component parts, including frame, running gear parts, intercooler, crosshead, motor and main bearings and various cut-away views are included. Variable capacity control information is listed along with data on governors. Diagram illustrates correct selection and coordination of auxiliary equipment. Worthington Corp.

383 Compressors — Bulletin A72, 36 pp, gives construction, operation information on company's Class WN-114 heavy-duty air compressors. Illustrates seven models of compressor as a single unit for displacement capacities from 1186 to 1948 cfm, twin units furnishing up to 3896 cfm. Joy Mfg. Co.

VALVES, TRAPS, PIPING AND ACCESSORIES

384 Choosing the Right Valve — Presenting valve selection as a matter of matching the valve's service characteristics with the service requirements of the job, this practical 20-pp booklet explains and illustrates basic design features of gate, globe and check valves. It tells in non-technical language, how each of these valve types works, and where it is best suited for use. Disc, stem connection, bonnet and bonnet-joint characteristics are also discussed and stem-operation is treated. Crane Co.

385 Bronze Valves—Globe and angle bronze valves with rising stems, union bonnets and stainless steel plug type seats and discs are

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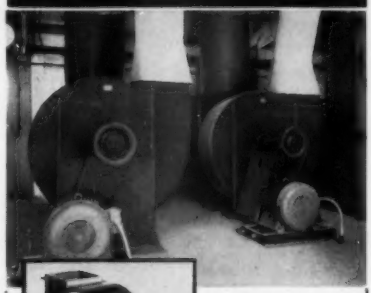

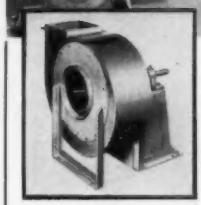

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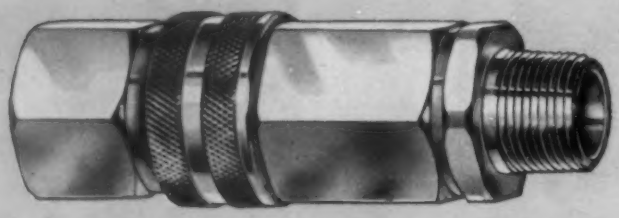

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described in this bulletin. Discusses design advantages, gives dimensions. The Walworth Co.

386 **Valve Charts**—Now available to plant engineers are three well-organized wall charts on valve types, selection and protection. "How to know valves" covers four main types of valves from the standpoints of their appearance, inside construction, service intended, operation and use. "How to select valves" discusses five major factors involved in the choice of a valve—fluid, temperature, pressure, size, and function. "How to protect valves"—written in "do and don't" style—covers 11 important points on valve installations, operation and maintenance. R-P & C Valve Div., American Chain & Cable Co.

387 **Butterfly Valves** — Construction details, engineering and application data on butterfly valves are provided in three illustrated bulletins. Eight-pp Bulletin 557 covers those of standard heavy-duty construction; Bulletin 558, 8 pp, those of standard medium-duty construction; and Bulletin 559, rubber-lined butterfly valves. W. S. Rockwell Co.

388 **Unions, Check Valves**—Illustrated Catalog 55, 24-pp, describes and provides ordering information on a line of forged steel unions and check valves. Socket-weld, high-speed, orifice, O-ring and other unions are included. Catalog provides service recommendations, dimensions and list prices. Also included is table covering discharge of water to atmosphere. Clayton Mark & Co.

389 **For Quick Valve Selection** — Here's a 20-pp catalog digest providing ordering and application information on gate, globe, angle and check valves in bronze, iron, cast and forged steel construction, also valve accessories and parts. Illustrated, includes pressure-temperature chart. The Ohio Injector Co.

390 **Lubricated Plug Valves**—Catalog PV-4, 36-pp, shows in detail a line of iron and steel lubricated plug valves. Many illustrations of single, screwed and bolted gland type valves are shown, including photos, sectional and detailed drawings. Also included is physical data on dimensions, ratings. The Wm. Powell Co.

The two Reader Service Cards on pages 207-208 are easy to use and need no postage. Just circle the item number of catalogs wanted.

391 **Bronze Valves**—Bulletin 110 points out the advantages of company's "500 Brinnell" bronze globe and angle valves with stainless steel seat and disc. Design features are illustrated and dimensional data is included. Kennedy Valve Mfg. Co.

392 **Automatic Controls**—Technical data on company's line of automatic controls are presented in this 46-pp catalog. Includes specifications, dimensional tables, electrical ratings and capacity data on diaphragm gas valves, magnetic valves, hydramotor valves, oil burner valves, reducing valves, safety shut-off electromagnetic valves, time delay valves, and others. Photos, drawings and dimensional diagrams illustrate text. General Controls.

393 **Diaphragm Valves**—Catalog V-55, 34-pp, covers operation, installation and selection of diaphragm valves for handling of acids, alkalis, gases, volatile and viscous substances, water and other fluids, compressed air, vacuum, slurries, semi-solids, beverages and food products. Diaphragm materials are described, selection tables included, as well as dimensional drawings and specification tables. Hills-McCanna Co.

394 **Valve Installation Tips**—Comprehensive instructions on proper way to install company's Line Blind valves are given in this pocket-size 24-pp manual. Concisely written, the booklet is illustrated with cartoon-type drawings. A

DATA FILE

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separate section is devoted to trouble shooting for faulty-installation techniques along with recommended corrective procedures. While dealing primarily with Line Blind valves, this information can be applied also to gate, globe and plug valves. Hamer Oil Tool Co.

395 **Automatic Regulators**—Illustrated information on 12 basic control valve types used in chemical process industries, power generating facilities, and in liquid or gas pressure control applications requiring precise instrumentation by automatic regulators is presented in this bulletin. Reducing valves, pump governors, relief valves, temperature regulators, float valves, damper regulators, combustion control valves, and boiler feedwater regulators are among the items treated. Atlas Valve Co.

396 **Steam, Air and Gasoline Traps**—Catalog 751, 32 pp, is a trap ordering book with capacity tables, installation diagrams, and containing charts and formulas for determining proper size trap for specific applications. Covers thermostatic steam traps, expansion steam traps, weight-operated traps for steam, air, gasoline, pressure up to 1500 lb. W. H. Nicholson & Co.

397 **Steam Trap Selector**—Twelve-pp Bulletin T-9 is designed specifically to aid in the selection and application of steam traps on chemical processing equipment. Features a fold-out piping diagram for 22 pieces of typical processing equipment—each showing recommended steam trap and piping arrangements. Also contains steam trap selector tables. Yarnall-Waring Co.

398 **Steam Trap Solutions**—Bulletin F-151, titled "Solving Steam Trap Problems," is a 36-pp illustrated booklet giving specifications and capacities of steam and float traps, air release valves, pipe line strainers. Tells how to calculate condensation loads and select traps for unit heaters, jacketed kettles, submerged surfaces. Gives pointers on installing and servicing traps. Also included in this edition is information on combination flat and thermostatic traps. The V. D. Anderson Co.

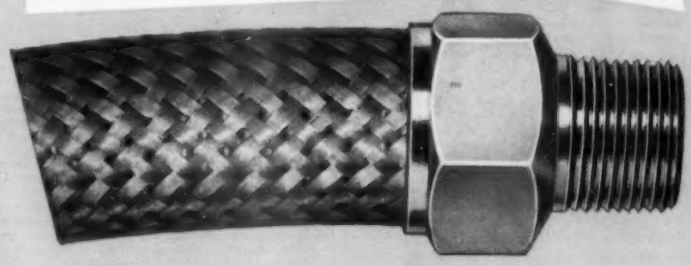
399 **Glass Pipe and Fittings**—Corrosion-resistant qualities of this Pyrex brand glass pipe and fittings which make it suitable for use under corrosive conditions are described in 18-pp Bulletin EA 3. Operating temperatures, physical characteristics, installation procedures are covered and specifications and dimensional drawings are included. Corning Glass Works.

400 **Wrought Iron Pipe**—Technical information required in specifying pipe and tubing is graphically presented in this 52-pp catalog. Tables list size and dimensional data of wrought iron pipe and tubular products, and show dimensions. Data is also provided on wire and sheet metal gages, flow of water in gpm and conversion factors. Tables include size and dimensional data for various types of pipe. Supplementary tables give information on wrought iron physical characteristics and special properties. A. M. Byers Co.

401 **Improved Hose Coupling**—A quick connect-disconnect hose coupling for water, oil, steam, gas and chemical lines is described in this 16-pp bulletin. Describes the coupling's construction and explains how it provides a sealing action which makes the coupling tighter as internal pressure increases, and a full swiveling action that prevents hose twisting and kinking. Titeflex, Inc.

402 **Jacketed Piping, Cocks**—Twelve-pp Bulletin 152 discusses the special advantages, problems and requirements of jacketed piping installations and shows how manufacturer's jacketed piping, cocks, fittings and relief valves are designed to fulfill requirements. Illustrated with photos and drawings, includes specifications. Parks-Cramer Co.

403 **Welding Fittings**—When and where to use company's Weldolet welding fittings is told in 38-pp Bulletin W-4. Includes tables listing sizes, dimensions, weight, and price, as well as dimensional drawings. Installation procedure is fully described and specifications, graphs providing reinforcing information, and photos of typical applications are also included. Bonney Forge & Tool Works.



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INSTRUMENTS, CONTROLS

404 **Versatile Electronics**—How flexibility of electronic temperature controls makes them useful in a wide range of heating and air conditioning installations is explained in this 16-pp booklet, Bulletin SA-2681. Purpose of publication is to fill the gap between the theory of electronic bridge circuits and specific control layouts and circuit diagrams. Four basic features that give electronic control its flexibility and application to a wide variety of installations are described. Minneapolis-Honeywell Regulator Co.

405 **Thermostatic Shower Control** — Safety advantages of the Hydroguard thermostatic controls for showers are outlined in illustrated Bulletin 366. Design and construction details are shown, capacity, and applications in industrial plants and institutions cited. The Powers Regulator Co.

406 **Automatic Controls** — Mercury-switch equipped controls for heating, refrigeration, air conditioning and other industrial uses are presented in 52-pp Catalog 856. Fully illustrated, book provides ordering and application information on a variety of pressure controls, temperature controls, level controls, limit and fan controls, and many others. Also presents data on relays, and on tilting-type and magnet-operated mercury switches. The Mercoid Corp.

407 **Zone Control Equipment** — Economical operation of the heating plant through use of a zone heating control system is the subject of illustrated 12-pp Apparatus Bulletin T-385. Describes a standard and clock model, discusses electronic principle of the control system, lists specifications. Schematic drawings point out applications, show dimensions of cabinets and of bulbs and accessories. Johnson Service Co.

408 **For Limited Panel Space**—Bulletin 532 describes Model 216 indicator used with company's automatic tank contents gage. Bulletin contains a full illustration of indicator which, although occupying a small space, has a scale length of 20 in. Also included is a description of operation of gaging system and mounting dimensions. The Liquidometer Co.

409 **Contour Projectors**—The use of projection or optical gaging with company's contour projectors is discussed in this illustrated bulletin. Points out chief advantages and describes typical applications. Specifications and dimensional diagrams for a number of models are included. Eastman Kodak Co.

LUBRICANTS, LUBRICATION

410 **Proper Lubrication** — Presenting proper lubrication as the life blood of all machinery, 36-pp Lubriplate Data Book 54-1 is a helpful treatise on modern lubrication practice. Gives product data on both oil type lubricants and greases and discusses choice of lubricants for use in applications involving heavy loads, high speeds, extreme temperatures, water conditions and other conditions. Provides tables of specific recommendations for various classes of equipment used in chemical processing, metal-working, other industries. Lubriplate Div., Fiske Brothers Refining Co.

411 **Centralized Lubrication** — Pocket-sized 24-pp, Form 34-22, called "Ask Anyone in Industry" describes in comic-book form the hazards and inefficiency inherent in conventional lubrication practice and promotes use of centralized lubrication—in the form of Alemite Accumeter measuring fittings. Shows how these are connected by tubing to a lubrication pump which is controlled by a timer. Alemite Div., Stewart-Warner Corp.

412 **"Fringe Area" Lubrication** — Revised Bulletin 103A lists 17 types of molybdenum disulfide lubricants and features an explanation, with diagrams, of applications in extreme bearing pressure, and high, low and normal temperature lubrication. Five new lubricants are included. A selector chart describes each type, kind of carrier used in it, temperature range in which it operates best, and method of application. The Alpha Molykote Corp.

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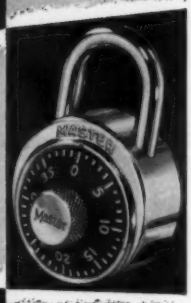

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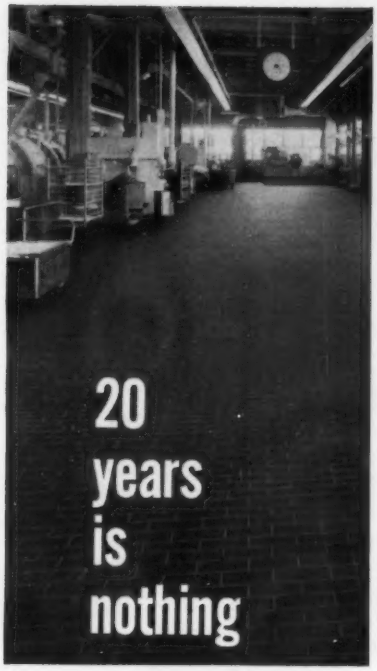

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(Begins on page 211)

413 **Lubricating Air Conditioning Machinery** —The problems of lubrication of air conditioning machinery are discussed in V.41 No. 7 of "Lubrication," a company magazine. Describes various components of refrigerating system and discusses lubrication practice, effects of refrigerants on lubricating oil, oil carryover, and lubricating oil requirements. The Texas Co.

SYNTHETICS

414 **Nylon For Maintenance**—Nylon as a maintenance material for mechanical, chemical and electrical applications is described in this illustrated folder. Advantages are given, and specific uses listed along with a lineup of material's maintenance properties. Stock shapes and sizes are shown and finished parts illustrated. Tips on machining are offered. The Polymer Corp. of Pennsylvania.

415 **Neoprene Design Book**—This illustrated bulletin discusses the properties of Neoprene, showing how they are utilized in products made from this chemical rubber. Covers its toughness, hardness range, air retention, performance under load, at extreme temperatures, flame and chemical resistance. Elastomers Div., E. I. du Pont de Nemours & Co.

416 **Synthetic Fluids, Lubricants** — Form F-6500D, 52-pp, on synthetics, covers properties, applications, and characteristics of these polyalkylene-glycol derivatives. Describes uses as mechanical lubricants, hydraulic fluids, rubber and textile lubricants, heat-transfer fluids, antifoam agents, solvents, and formulation components. Engineering data is presented in the form of tables and charts, and application photos included. Carbide and Carbon Chemicals Co., Div., Union Carbide and Carbon Corp.

ELECTRICAL

417 **Variable Speed Motors**—Sixteen-pp Bulletin 1797, revised, outlines many reasons why variable speed motors can be used to improve production, and it includes illustrations of all types of company's Varidrive motors, as well as their mechanical features, remote controls; etc. U. S. Electrical Motors, Inc.

418 **Motor Buying Guide** — Bulletin GEC-1026, 28-pp, features company's standard a-c fractional and integral horsepower motors in most general use. Included are general- and definite-purpose, fractional horsepower motors, and fhp gear motors. A section on selection of integral horsepower motors covers horsepower requirements, enclosures, starting current limitations, speeds, motor types, and selection of fuses and circuit breakers. Descriptions and specifications cover single-phase, polyphase, totally enclosed fan cooled, and gear-type integral horsepower motors. Photos, ratings, dimensions, weights, frame numbers, and modifications included. General Electric Co.

419 **Testing Instruments** — Bulletin 19-56, 16-pp, features company's electrical testing instruments, including ohmmeters, ground testers, dielectric test sets, motor rotation tester, cable fault locating equipment, transformer turn ratio test sets, corona test equipment, frequency meters, tachometers, others. Includes photos and descriptions of each type, including chief features, operating ranges, and suggested applications for them. James G. Biddle Co.

420 **Enclosed Switches**—Catalog 83, 28-pp, describes in detail enclosed switches for industrial applications. Included are general switches designed for use on either a-c or d-c purpose switches, sealed switches, heavy-duty limit switches, hand operated switches, and maintained-contact switches, all of which are available in a variety of actuator designs, contact arrangements and electrical ratings. Photos, dimensional drawings, circuit diagrams, electrical data are included. Micro Switch, Div., Minneapolis-Honeywell Regulator Co.

421 **Switch Wiring Diagrams**—Bulletin 709 is a 36-pp booklet of typical wiring diagrams for across-the-line starting switches. Indexed and arranged for easy use, this booklet serves as a guide to some of the many ways in which this company's manual and magnetic

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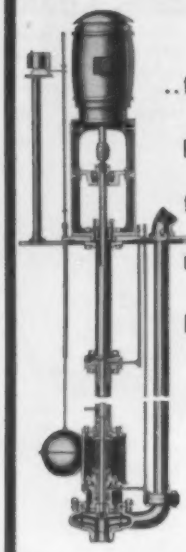

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(Begins on page 211)

across-the-line starters can be applied. Some of the diagrams incorporate more than one useful feature. Includes key to electrical symbols used. Allen-Bradley Co.

422 **Control Relay**—Eight-pp Bulletin PL 7305-PM describes company's line of control relays, designed to occupy minimum panel space, and available in models with from two to 12 poles. Pictures 10 models, gives dimensions, enclosures, features, and data on maintenance and pole conversion from normally-open to normally-closed; and lists literature and template kits available. Clark Controller Co.

423 **Commutator Slip Ring Maintenance**—This practical little 40-pp handbook gives procedures and methods for commutator and slip ring maintenance. Generously illustrated with photos and sketches, booklet contains sections devoted to common troubles and their corrections; brushes; general maintenance; and company's products for maintenance of commutators and slip rings. Defines commutator terminology. Ideal Industries, Inc.

424 **What You Should Know About Circuit Breakers**—Sixteen-pp Manual 101 explains operating principles of basic circuit breaker designs and provides engineering data on factors of application. Includes simplified diagrams of three basic types. Illustrates with colored charts and diagrams, explains temperature factors, inrush current effects, tripping and reset time. Heinemann Electric Co.

425 **Panel Components**—Bulletin EE-120 is a 54-pp panel builders handbook of electrical components, containing specifications, diagrams, dimensions, photos and price lists of company's motor control. Profusely illustrated with photos, dimensional and wiring diagrams, bulletin covers manual starters, relays and contactors, magnetic starters in non-reversing, reversing, and multi-speed types, and a group of accessories which include thermal overload relays, oil tight pushbutton units, limit switches, timing devices, solenoids, electrical interlocks, and solenoid-operated brakes. Cutler-Hammer, Inc.

426 **Trolley Busway Systems**—Three bulletins offer real help on electrical installations involving cranes and hoists, assembly and production lines, moving test lines and other moving electrical equipment. Bulletin 35 (28-pp) covers 225-500 amp systems; Bulletin 50 (44-pp) 100 amp systems; Bulletin 45 (40-pp) 60 amp systems. Each includes special sections on installation planning and procedure, methods of mounting and descriptions and illustrations of equipment. Feedrail Corp.

427 **Wire and Cable**—Bulletin 1096, 16-pp contains detailed information on electrical wire and cable, as well as insulation and protective covering. Two selection charts—one by application and environment and one by cable type—are a practical guide to selection of best cable for a particular application. Minimum standard industry specifications are listed. Trade names, products and applications are also given. The Okonite Co.

428 **Aluminum Conduletes** — Bulletin 2681, 24-pp, lists copper-aluminum conduletes designed to resist the corrosive action of many chemicals in highly corrosive locations. A pictorial index and price list cover the various types available. Crouse-Hinds Co.

429 **Battery Manual**—Battery selection techniques are emphasized in 20-pp Bulletin 210, a revised edition of this manufacturer's manual on storage batteries for stand-by power, emergency lighting and switchgear applications. A discussion of charging equipment and simplified battery maintenance procedures is included. Storage battery installation procedures are described and illustrated by photos. Exide Industrial Div., The Electric Storage Battery Co.

430 **Handbook on Storage Batteries**—This 64-pp booklet of instructions and technical data is the sixth edition of this company's battery service manual. Provides a brief treatise on the theory of the lead-acid battery. Gives detailed instruction on the care and operation of batteries, on maintenance and repairs, and on standard and special parts. Booklet is of special value to plant engineers concerned with storage batteries for cycle service in industrial trucks and materials handling equipment. Gould-National Batteries, Inc.

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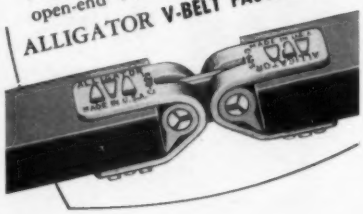

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DATA FILE

(Begins on page 211)

431 **Motive Power Batteries** — This 48-pp general service manual on lead acid batteries for all types of motive power application is a practical guide to industrial cycle service, including industrial truck, air conditioning, and others. Includes photos, charts, tables, methods of repair, maintenance and theory of operation, instructions covering repairs with regular or special tools, simplified testing methods including safety practices, acid handling precautions, and charging methods. C & D Batteries, Inc.

432 **Flexible Cords** — This well-illustrated 24-pp booklet includes all new Underwriters' classifications for flexible cords manufactured by this company. Featuring data on Dynaprene and rubber jacketed cords as well as braid covered types, also gives tips on how to select proper cord. Whitney Blake Co.

433 **Wire-Wound Components** — Catalog R-200, a 36-pp guide to manufacturer's electronic components, describes subminiature resistors, precision and power resistors, IF and RF transformers and coils. Table and charts give specifications. I-T-E Circuit Breaker Co.

VIBRATION CONTROL

434 **Improved Machine Mounts**—This brochure describes advantages of company's leveling machine mounts. Tells how they enable installation and leveling of heavy machines without bolting or shims, afford increased machine mobility, reduce maintenance costs, and lessen noise. Barry Controls, Inc.

435 **How to Cut Vibration**—The use of Vibra-Mount felt in reducing machine vibration and accompanying noise is covered in this 20-pp illustrated booklet. Tells where this shock-absorbing felt is used effectively, how to select the proper mount, and how to install it. Cost information is provided, other felt products are listed. American Felt Co.

LIGHTING, COMMUNICATIONS

436 **Fluorescent Lighting**—This 24-pp fluorescent lighting guide book is a reference digest on fluorescent products. Gives advantages of this type of lighting; summarizes various lamps and parts, including starter sockets, lampholders. Includes reference chart for lamp performance when interchanged with typical ballasts. Sylvania Electric Products Inc.

437 **Guide to Luminaires** — Pocket-size, 28-pp Bulletin B-5799-BB covers fluorescent luminaires for industrial and other use. Summarizes salient features of each type of luminaire as it discusses electrical characteristics, maintenance and mounting data, details of construction, dimensions, and recommendations for application. Also contains a pictorial guide to floodlights and incandescent luminaires for industrial and other use. A 4-pp tabulation of buying data concentrates information needed for procurement. Westinghouse Electric Corp.

438 **Industrial Lighting Equipment** — Technical data on company's CFI-10 and CFI-25 industrial lighting equipment with porcelain enamel reflecting surfaces is featured in two new illustrated bulletins. Chief design features are pointed out and dimensional data are given. Day-Brite Lighting, Inc.

439 **How to Use Sound Signals**—This 44-pp combination manual, data book and catalog is an excellent reference work on industrial sound signals. Includes a simplified explanation of fundamentals of sound; a glossary of sound and signal terminology; a quick-comparison guide for selecting equipment; suggested steps in choosing a signal installation, and hints for compiling a code signal call system. Benjamin Electric Mfg. Co.

440 **Signal Equipment** — Tips on how to select suitable signals for any specific operation are offered in one of a series of bulletins—Nos. 100-125—bound in this 40-pp catalog. Other bulletins describe horns, bells, warning lights, other signal equipment. Specifications, photos, wiring diagrams, dimensions, audibility

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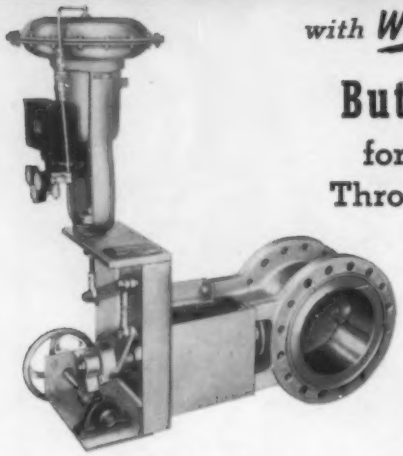

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(Begins on page 211)

rating charts, electrical characteristics and other data included. Federal Sign & Signal Corp.

441 **Sound Measurement**—Form 797-C, 12-pp, outlines the many applications of sound and vibration measuring instruments and describes several models of sound level meters designed for measuring intensity of sound and analyzing its various frequency components. Includes specifications and full descriptions of the models, along with photos of the instruments in use and data on various accessories. General Radio Co.

FANS, VENTILATING

442 **Standard Duty Fans**—Design and construction details of company's line of standard duty fans are covered in 28-pp Bulletin 543. Points out advantages, shows arrangement and application, describes accessories. Tables list specifications. The New York Blower Co.

443 **Induced Draft Fans**—Eight-pp Bulletin DB-32-53 provides engineering information on manufacturer's Bifurcator fans for providing controlled draft for boilers and furnaces. Gives construction details, sizes. Illustrated with photos, diagrams of suggested methods for installation. DeBothezat Fans Div., American Machine and Metals, Inc.

444 **Industrial Fans**—Propellair Bulletin 650, 12 pp, contains dimensions, application, and performance data on Tubeaxial and Stack-booster fans. Gives information on cooling and drying problems, system and open surface tank ventilation. Robbins & Myers, Inc.

445 **Ventilating Equipment**—A 36-pp guide to selection of propeller fan type ventilating equipment, Catalog 151 includes specifications and installation data on company's propeller fans in portable, tubeaxial, centrifugal, roof ventilator and other types. Detailed illustrations of construction features accent design and performance factors. Case study photos show installations. Ilg Electric Ventilating Co.

446 **Ventilating Sets** — Quiet operation, rugged construction, lower costs and other advantages of Util-A-Vent sets are stressed in 30-pp Bulletin UVS 103. These sets are designed for low cost handling of applications requiring low and medium ranges of air capacities. Bulletin presents dimensional and capacity data on direct-driven units with forward curved wheels, and belt-driven units with forward curve or backward blade wheels. Performance curves are included, and some right and wrong duct installations pictured. General Blower Co.

PACKINGS

447 **Teflon Products** — Three bulletins present this company's Teflon packings, gaskets, special parts and stock. Bulletin CP552 describes Chempro lines of Teflon ring packing, Teflon impregnated asbestos packing, V-type packing, and Teflon seal cage—for use with acids and strong chemicals. Bulletin CP553 covers Teflon jacket gaskets, solid ring gaskets, expansion joints and special gaskets. Bulletin CP554 illustrates special parts. Chemical & Power Products, Inc.

448 **Buyer's Guide on Packing**—Twenty-pp Catalog PC-101 brings together all material on company's Palmetto packings and includes data on packing for liquid pistons and inside-packed piston pumps. Greene, Tweed & Co.

SLINGS AND WIRE ROPE

449 **Sling Chain Handbook**—Illustrated Data Book 100, 32-pp presents "how to do it" information on sling chains—from ordering to care, use and inspection. Contains diagrams, charts and tables on standard and special styles of sling chains and attachments, and their sizes, weights, and working load limits under many conditions. Columbus McKinnon Chain Corp.

450 **Sling Handbook**—The 64-pp Tuffy Sling Handbook is replete with illustrations, charts

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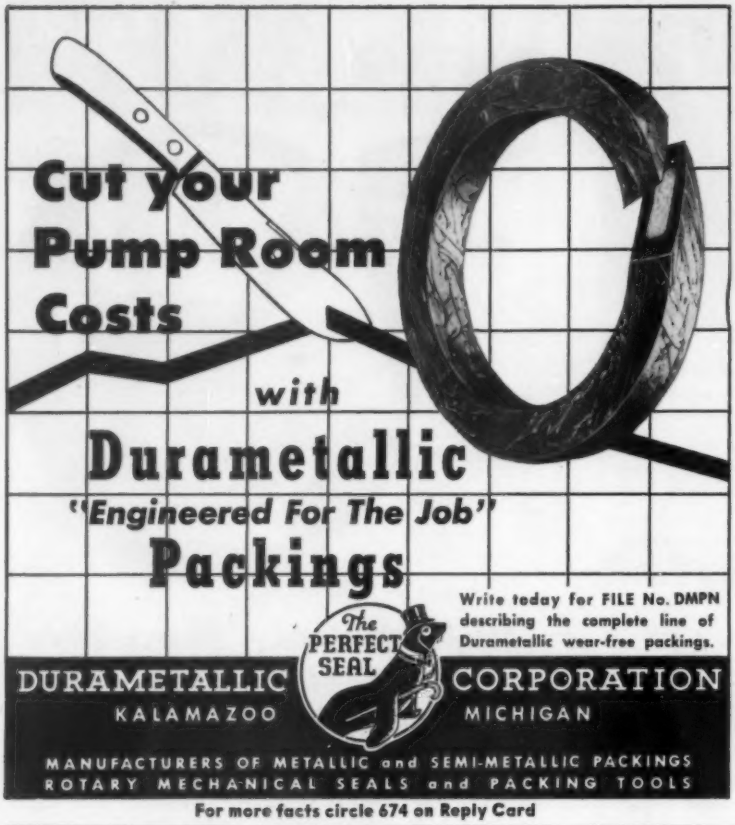
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DATA FILE

(Begins on page 211)

and diagrams describing 16 factory fitted slings and nearly two dozen standard fittings available for slings, including several which are recent additions to the line. Book contains a complete rigger's manual, shop chart of ratings, an engineer's notebook and standard signals for directing operations of overhead traveling cranes and derricks and locomotives. A new development featured is the steel ferrule splice now on all Tuffy slings, which affords safety and other advantages. Union Wire Rope Corp.

451 Wire Rope Assemblies — Catalog 5201, 22-pp, describes company's wire rope assemblies, used for operating controls, as a part of machinery and equipment, or for slings and hoists. Gives general applications for various types of wire rope assemblies, and includes specifications, ordering details. Macwhyte Co.

OTHER EQUIPMENT

452 Graphitization in Piping — "Considerations in the Evaluation of Graphitization in Piping Systems," (Reprint TR-594) is a 10-pp illustrated article. Subjects discussed include sampling procedure; bend testing, impact toughness evaluation, and metallographic evaluation; uniformity of graphitization; and heat treatment. Grinnell Co., Inc.

453 Steel Reservoirs, Standpipes—This 24-pp booklet pictures installation of reservoirs of 50,000- to 10,000,000-gal capacity, having cone, umbrella or ellipsoidal roofs and ornamental structures with special architectural features. Chicago Bridge & Iron Co.

454 Magnetic Selection Guide — Twelve-pp illustrated Catalog C-5000-B, describing manufacturer's entire line of magnetic separators and lifting magnets, serves as handy guide to selection. Dings Magnetic Separator Co.

455 Drawing Instruments—This 40-pp ordering booklet covers drawing instruments, drafting scales, stainless steel T-squares, straightedges, triangles and others, including a new Micro-Rule. This new instrument provides a means of measuring and laying out distances to 0.0001 in. without aid of a glass. Catalog is well illustrated with photos (many actual size) of the instruments, and includes sizes and prices, selection information and suggestions for care of instruments. Theo. Alteneder & Sons.

Reader Service Cards for ordering bulletins are on pages 207-208. Be sure to include your name, job title, and company, even if you want bulletins mailed to your home address.

456 Metal Finishing Systems—Bulletin HH-100 provides a quick view of the complete metal finishing equipment offered by this company. Shows washers, bake ovens, paint spray booths, pickling machines, sludge filter and other equipment. U. S. Hoffman Machinery Corp.

457 Industrial Leathers — These illustrated data sheets cover company's leather products and include belting. Also give data on leather packings for hydraulic and pneumatic equipment. J. E. Rhoads & Sons.

458 Preheating Combustion Air—This well-illustrated 36-pp booklet explains fuel savings and increased performance made possible by using waste heat in flue gases to preheat incoming combustion air. Also covers increased boiler output, ability to use lower grade fuels. Air Preheater Corp.

459 Testing Equipment—Designed for use as a guide in the selection of water testing equipment, this 12-pp bulletin describes complete line of titration stands and tests for hardness, alkalinity, chloride, sulfide, etc.; cabi-

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DATA FILE

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nets and test set for similiar tests; Conducto Bridge for determination of specific conductance of water solutions, colorimetric comparators; and the photometer. W. H. & L. D. Betz.

460 **Humidification for Profit**—Bulletin 500, 16 pp, includes physical data and prices on electrically controlled and air operated humidifiers. Handbook section explains how relative humidity affects hygroscopic materials, static electricity, health and comfort. Photos show installations and several pages are devoted to selection and installation tips. Many helpful tables included. Armstrong Machine Works.

461 **Glass Fiber Products**—Form WPD-11, 8 pp, describes and illustrates uses of Microlite and Super-Fine blanket insulations for thermal and acoustical treatments. Also features Microflex compressed board; a resilient cushion material; quartz and glass Micro-Fibers, reinforcements for plastics and yarns for use in textile industries. L. O. F. Glass Fibers Co.

462 **Advice on Washrooms**—Information on company's washroom advisory service is available to plant engineers. Tells of plans and specific suggestions. Scott Paper Co.

463 **Aluminum Jacketing** — How efficiency can be improved and maintenance cut with weather-proof aluminum jacketing is told in this illustrated bulletin. Applications for insulated lines, towers, vessels, and tanks are described, installation photos and specifications included. Advantages of Lap-Seal feature in providing a positive weather seal are stressed. Childers Mfg. Co.

464 **Air Filter**—Bulletin 117, 8-pp, describes advantages of Poro-Stone air filters for compressed air systems. Cutaway views and other drawings illustrate construction and operation features, tables show capacities of the units. R. P. Adams Co., Inc.

465 **Improved Heat Insulation** — This 8-pp bulletin describes Super-Light 85% Magnesia for temperatures to 600 F, available in cement blocks, pipe sections. Twelve advantages of this lightweight insulation are detailed. Recommended thickness, physical characteristics, prices are given. Also included is information on combination coverings with Tempchek inner layer for temperatures from 550 to 1500 F. The Philip Carey Mfg. Co.

466 **Filters, Strainers** — Industrial Catalog 1054, 48 pp, provides application and engineering information on company's line of microfilters and precision strainers. Fuel filters, full flow and by-pass lube filters, air separators, and metal edge strainers for fuel lube and industrial use are presented along with construction details, performance data, and specifications. Purolator Products, Inc.

467 **Ductile Iron**—Cast iron that can be bent is described in this 28-pp revised edition, with tables, charts and photos. Photos show applications of ductile iron castings, and bulletin lists typical applications in various industrial fields. The International Nickel Co., Inc.

468 **For Lining Vessels** — Bulletin 1012 gives details on a formula for lining steel vessels on the job and greatly extending their service life. Tells how to prepare and apply this inexpensive lining, includes data on coverage. Pocono Fabricators, Inc., Div., The Patterson-Kelley Co., Inc.

469 **Filter Fabric Facts** — This 16-pp illustrated booklet contains information about filtration principles; filtering devices; filter media; textile fabrics for filtration; a comprehensive chart on chemical and heat resistance of cotton and synthetic fabrics; sections on yarns, fabrics construction and finishing; and a round-up of filter fabrics in use. Photos illustrate variety of filter fabrics being produced for industrial use. Wellington Sears Co.

470 **Swivel Joints**—Catalog G-4, 32 pp, covers this manufacturer's line of ball-bearing swivel joints as well as other products including loading racks, manifolding lines, all-metal hose. In addition to providing dimensional and operating data on these products, this booklet is generously illustrated. Chiksan Co.

NEW!

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Now! You can ventilate large or small areas at low cost. The new, all-weather ILG Type LSQ Ventilator quietly, smoothly discharges stale air in a streamlined flow pattern. Easy to install, it is sturdily built with ILG's quiet "Q" propeller coupled directly to the motor to reduce maintenance to a minimum. Aluminum housing requires no painting—ever. Contact your ILG distributor about the advantages of this new roof ventilator today or write for complete information.

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Buffalo, N.Y., E. H. Seelbach, Box 56, Kenmore Sta.
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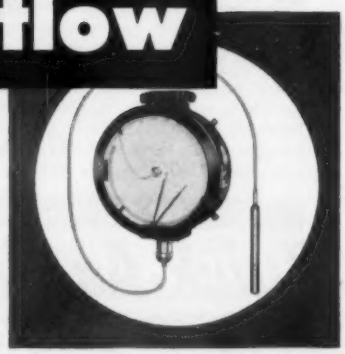

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Send for Condensed Catalog of rugged mercury-actuated Partlow Temperature Controls for gas, liquid or solid process control in —30°F to 1200°F range.

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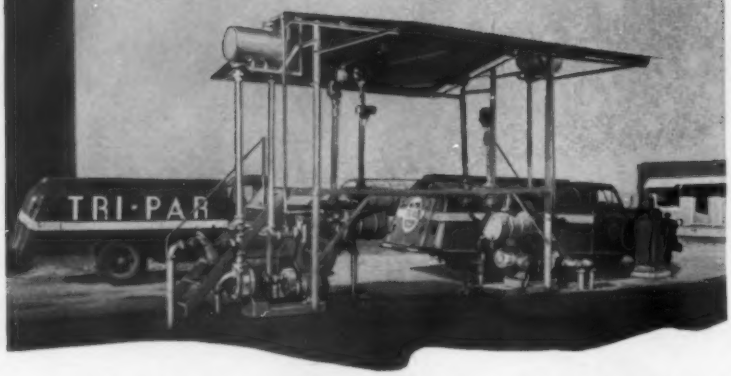
In EITHER DIRECTION



TRI-PAR Oil Company, Saukville, Wisconsin, makes good use of Viking Pump's reversible feature. The pumping system has a single suction line and a single discharge line which can be operated in either direction, eliminating the piping manifold. Speeded to deliver 325 G.P.M. the pumps can unload transports to storage and load delivery trucks from storage by merely reversing action.
Pumping units have lost no time from their operation during the three years they have been in service, and have handled approximately 25,000,000 gallons of gasoline and fuel oil in that period.
Perhaps Viking Pumps can speed your operation and simplify your pumping. Types and sizes for most industrial pumping. For information, write for Bulletin 565z.

VIKING PUMP COMPANY
Cedar Falls, Iowa, U.S.A. In Canada, it's "ROTO-KING" pumps
See our catalog in Sweets

For more facts circle 685 on Reply Card

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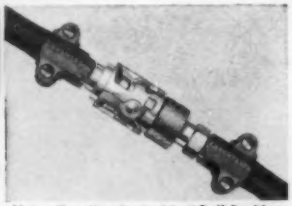
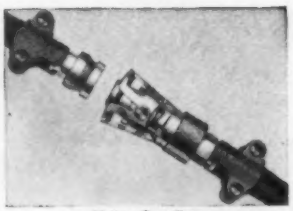
safety type, locking, quickly detachable


Valve Coupling Locked in "On" Position

VALVE COUPLINGS
give operator complete control of the air line at any point

Operator can shut off air and change tools quickly. Newly improved design permits the coupling to be locked in either "On" or "Off and Exhaust" position. Air in tool is exhausted to atmosphere automatically, preventing accidents. Pressure tight leak-proof construction — but free swiveling to avoid kinking the hose. For any application involving line air to 250 psi.


Valve Coupling Unlocked and Disconnected

Valve Coupling Locked in "Off and Exhaust" Position

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2084 EAST PERSHING STREET • SALEM, OHIO

For more facts circle 686 on Reply Card

Safe Drinking Water

(Continued from page 103)

of installing bleed connections in these lines of limited use. In order to minimize contamination, the plant construction and maintenance organization has been instructed to sterilize all valves and piping added to the city water system before water service is restored. Sterilization is accomplished by the use of 50-75 ppm solutions of free chlorine. These solutions are made up from the city water and HTH (high test calcium hyprochlorite) which has 70 per cent free chlorine on a weight basis.

With all of the above precautions, bacteria have been held at a minimum and no B-coil or "gas formers," the really dangerous items in drinking water, have been found. The installation of the bleeds is at slight cost. Cost of water wasted through these bleeds is approximately $58.00 per month. Such a sum does not justify changing the system to a central or recirculating type at this time.

Want Tear Sheets?

Don't tear up your issues; the next man may want to read the same article. If you would like additional copies of any of the articles write to the editor. Thanks.

HELP WANTED

WANTED

Kentucky location of national concern has excellent permanent situation in plant engineering department for mechanical, chemical or electrical engineer with approximately two years experience in maintenance or operation of general chemical plant equipment. Must have desire for early recognition of ability and performance since position open is in direct line for possible early advancement to greater responsibility in engineering or production.

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RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by zinc pluting, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Quick grease-gun lubrication provides easy maintenance.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

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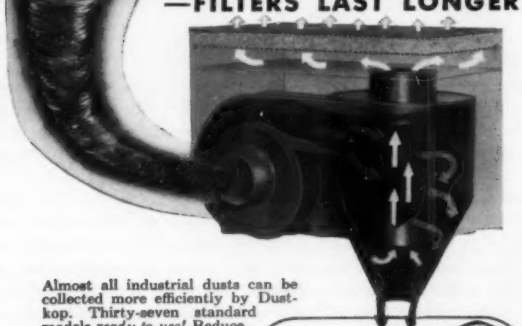
FOR MORE EFFICIENT DUST COLLECTION —FILTERS LAST LONGER



Almost all industrial dusts can be collected more efficiently by Dustkop. Thirty-seven standard models *ready to use!* Reduce installation costs — save space. Write for descriptive literature.

DUSTKOP STOPS DUST

ALSO A COMPLETE LINE OF MIST COLLECTORS

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1000-lb. hoist places cylinder head on engine. No burned-out motors to stall production.

KELLER TOOL AIR HOISTS
make handling easy as it looks

Speed your handling jobs . . . in assembly, foundries, machine shops, shipping rooms — wherever dependable, controlled raising and lowering are needed.

CHECK THESE FEATURES BEFORE YOU BUY ANY HOIST

- **NO BURN-OUT** from overload or stalling.
- **LOW MAINTENANCE** — rugged piston-type motor unaffected by dust or fumes.
- **ECONOMICAL**—uses much less air than other hoists of same capacity.
- **CONTROLLED SPEED**—from creep to maximum.

Model	Capacity	Speed	Weight
86-2V20	2000 lb.	19 f.p.m.	78 lb.
86-2V20L*	2000 lb.	19 f.p.m.	78 lb.
86-2V10	1000 lb.	35 f.p.m.	78 lb.
86-1V10	1000 lb.	19 f.p.m.	28 lb.
86-1V10L*	1000 lb.	19 f.p.m.	28 lb.
86-1V5A	500 lb.	35 f.p.m.	28 lb.
86-1V3	300 lb.	80 f.p.m.	28 lb.

** Models with link chain*

BULLETIN 86 gives specifications and data on attachments.

GARDNER-DENVER

KELLER TOOL division, Grand Haven, Michigan

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

For more facts circle 689 on Reply Card

NEW PRODUCTS

(Begins on page 136)

67—GRILLE for use under the larger windows

Uni-Flo Model ST is a grille designed for continuous line installation under large windows to prevent cold convection currents which often occur near large window areas. It is announced as ideal for heating, ventilating, and air conditioning buildings where large glass areas are used. Several finishes are available. Catalog F-7757 gives descriptive and other data. Barber-Colman Co.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 207-208.

68—TURN-TABLE BASE for bench type grinders

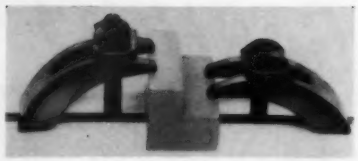
This turn-table base is claimed to facilitate use of any bench type grinder; it is designed to accommodate manufacturer's Model AA Carbide Grinder or Model AP Precision Grinder. By means of a quick-acting positive clamp, the grinder may be turned so that either end faces the operator in the most convenient position. This facilitates quick change from roughing to finishing, without requiring the operator to move from one end of the machine to the other. It also permits mounting the grinder anywhere on a long bench, up against a wall, etc. making it possible to locate the grinder conveniently near work. Thomas Prosser & Son.

69—CASTER, double duty, four-position swivel lock

This four-position swivel lock caster is available in several sizes for medium- and heavy-duty service. The plunger-type lock is accessible and positive in action, it is noted, making the swivel caster into a stationary model. Flexibility and easy steering are readily obtained, says manufacturer, and the caster comes in a variety of treads, in semi-steel, soft or hard rubber, Neoprene. Darnell Corp., Ltd.

70—HOLD DOWN CLAMPS, fast 'n easy to use

Insta Clamps are fast and simple to operate, says manufacturer; they clamp without shims to the full capacity of the clamp, and their use eliminates need for vises on many jobs. Narrow grooves, ledges or corners provide sufficient purchase for Insta-Clamps, it is claimed, and even one prong in position is strong enough to hold



the work. The clamps are made of heavy duty steel forgings, and steel washers, supplied with each clamp, serve to distribute pressure evenly and locate the pressure tangent point automatically. Two or more Insta Clamps lock any work piece in position, it is noted, and they're economically priced, too—around $7.50 a pair. Bausch Products.

71—FOOT SWITCH, low cost, for light duty

Applications for the Class 9002 Type CG-1 include a variety of light duty uses such as small industrial machine tools. This low cost foot switch is suggested for uses in which the heavy duty industrial type foot switch is neither required nor economically justified. It is a two-pole device with double-break contacts and can be used to control a 1 hp motor at 110 or 220 v a-c. Square D Co.

72—MOTORS for three common hazardous locations

Explosion-proof motors through NEMA frames 405 and 215 are announced as

INSTANT SETTING FLOOR PATCH

Repair broken factory floors without the usual traffic tie-up. Simply shovel INSTANT-USE into the hole or rut — tamp smooth — truck over! No waiting! INSTANT-USE bonds tight to old concrete — right up to a feather edge. It's tough. Wears like iron. Won't crack or crumble. Install complete overlay where floors are badly chewed up. Used indoors or out. Immediate shipment.

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Please send me complete INSTANT-USE information, details of TRIAL ORDER PLAN and Free INSTANT-USE BROCHURE—no obligation. (Clip and attach Coupon to Co. letterhead.)

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300° to 400° HANDLED BY THE TON
WITH SPENCER VACUUM

This 25 HP Spencer Portable Vacuum system is used in a metal plant to remove hot abrasive alumina dust around kilns during overhaul. An automatic dump on the primary separator allows quick and easy disposal of the ten or more tons of dust removed from each kiln. There is no waiting for the material to cool down. No back breaking hand work in the heat, and no dust scattered.

In a large and most modern incinerator plant, a Spencer 30 HP Stationary Vacuum System is used for cleaning the flues and combustion spaces and for general house cleaning. The workers do not have to wait 24 hours for a cool off, because the cleaning is done without entering the chambers. No shovels, no wheelbarrows, no dust, and the ash is removed at the rate of 108 cubic feet per hour.

Spencer portable and stationary systems are used for materials up to 300 to 400 degrees. Ask for Bulletin 155. 512-A

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THE SPENCER TURBINE COMPANY • HARTFORD 6, CONNECTICUT
SPENCER HARTFORD

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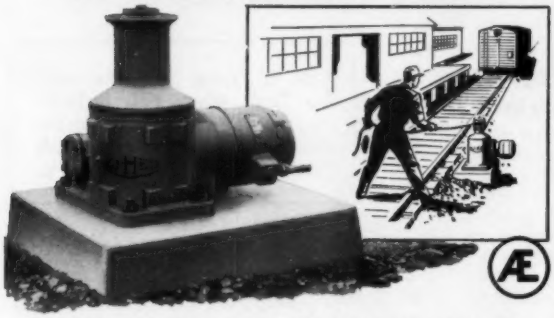

IF YOU actually saw a Lo-Hed Car puller in operation you'd probably order one in a hurry. It is a first rate investment — pays for itself fast. It puts a stop to shifting charges. Cars get loaded and unloaded in record time. Demurrage charges are slashed. Industrial accidents are minimized . . . And a Lo-Hed Car Puller saves money *inside* a plant, too — pulls loads in a straight line, up grades and around corners.

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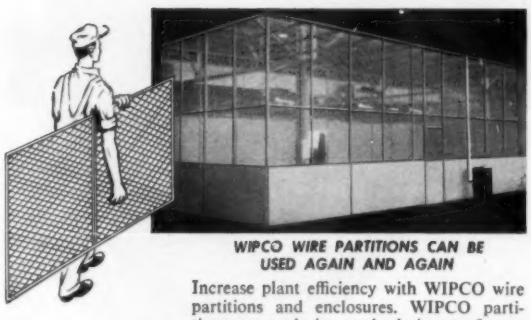
cost less to erect and maintain



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Easy to paint and clean, WIPCOs allow maximum circulation of air for heating and ventilating purposes. Use low cost WIPCO partitions for greater flexibility and more efficient plant layout. Write for bulletin No. P-52 today!

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INSIDE STORY:

WHY A HEAT EXCHANGER POSES FOR AN EX-RAY

This technician is giving a clean bill of health to a completed weld on a P-K heat exchanger. Like the x-ray of your chest, this x-ray picture is designed to pick up flaws before they have a chance to become harmful.

Such radiographs are indispensable in manufacturing pressure vessels that will meet every test of time and use. Each x-ray is checked by a representative of the Hartford Steam Boiler Inspection and Insurance Company — for further insurnnce that every P-K heat exchanger meets or exceeds the rigid standards of the 1952 ASME Code for Unfired Pressure Vessels.

But weld x-rays at P-K represent only a precaution. They don't tell you that P-K welders are ASME qualified for over 50 types of welding procedures. Nor do they show the incredibly careful design and calculation that goes into every P-K pressure vessel, to assure that it will be thermally and physically correct in every way.

Add this all-important knowledge of thermal design to P-K's fabricating and testing procedures, and you have what makes P-K heat transfer equipment different — and better — than all the rest.

Like proof? We'd be delighted to receive your inquiry. The Patterson-Kelley Co., Inc., 1350 Burson Street, East Stroudsburg, Penna. Offices in principal cities.

PATTERSON KELLEY

Heat Exchangers • Converters • Storage Water Heaters • Condensers
Water Chillers • Oil Heaters • and all types of heat transfer equipment

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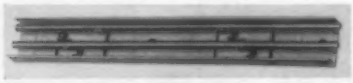
NEW PRODUCTS

(Begins on page 136)

meeting underwriters' requirements for the three most common hazardous locations: gaseous, explosive dust, and explosive grain dust. These motors are treated to resist moisture, dust and corrosive atmospheres and feature extra long flame paths at shaft and bracket fits and sealed, pre-lubricated ball bearings. They are available in standard, geared, or variable speed models, with optional mountings to meet individual requirements. Sterling Electric Motors, Inc.

73—TUBE RACE supports tubes in branch runs

To provide an efficient yet inexpensive method of supporting a limited number of tubes that often occur in branch runs to and from the main runs of company's



tube supporting system, this race comes in 16-ft sections and is available in widths of 1, 1½ and 2½ in. It is equipped with tube clips spaced at 2 ft intervals to accommodate ¼ or ⅜ in. tubes. Connections and changes of direction are made by field cutting and welding. If wider widths are desired they are supplied with a pin-type coupler that permits connections and bends to be made with standard fittings. Tubes are secured in these widths by cushion clamps. Main tubing runs are held by expanded metal trough in up to 24-in. widths. Instrof Corp., Div., T. J. Cope, Inc.

74—CONTROL VALVE for straight, angle installation

This two-way Flo-Control Valve, adaptable to either straight or angle installation, is used to prevent gravity circulation in a forced hot water heating system when booster pump is not in operation. Designed to reduce amount of inventory needed for this type of valve, it is available in the 1, 1¼ and 1½ in. sizes and replaces the individual straight or angle pattern valves of the same size. Valves are available in cast iron or bronze construction and in sizes from ¾ to 4 in. Bulletin HL-256 gives more details. Bell & Gossett Co.

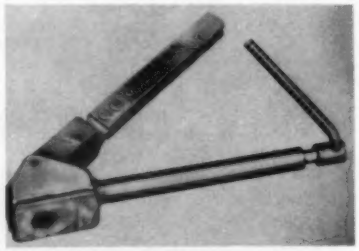
75—IMPROVED INSULATION for cold water pipes

Significant new characteristics are announced for this company's Impervo, Perfecto and Protecto Insulations. Complete control over the thickness of these products is now available, it is noted, and the use of less adhesive in combining the insulating felts has been made possible to effect a minimal amount of shrinkage. Impervo is specified for use on ice water and cold water pipes to keep water cold and prevent sweating. Perfecto can be used for hot or cold water pipes and Protecto is used to reduce the danger of freezing of exposed water pipes. The Philip Carey Mfg. Co.

One of these products may be "just what you're looking for." Use the handy Reader Service Cards to ask for more information on it.

76—HANDY TOOL for removing spot welder tips

The Ejecto Tip Puller tightens over the tip by means of a small high leverage crank. Easy pressure on the handles then withdraws the tip quickly and without damage to either tip or horn. Miller Electric Mfg. Co.



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Made with Type "SH" Cortland Emery Aggregate and high grade cement, wear resistant EMERI-TOPCRETE is ideal insurance of longer floor life. Economical . . . easily installed . . . tough . . . durable . . . non-dusting . . . non-absorbent . . . excellent anchorage . . . non-rusting . . . won't pock . . . won't spall. Careful emery selection and processing assures constant quality, unvarying results.

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CONVERTIBLE
QUARTER-TONNER
Well can be moved to truck body by removing four bolts. Entire truck crane assembly weighs only 100 pounds.

LOW COST-LARGE PERFORMANCE

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Other models are available in capacities to three tons in floor cranes, two tons in truck cranes.

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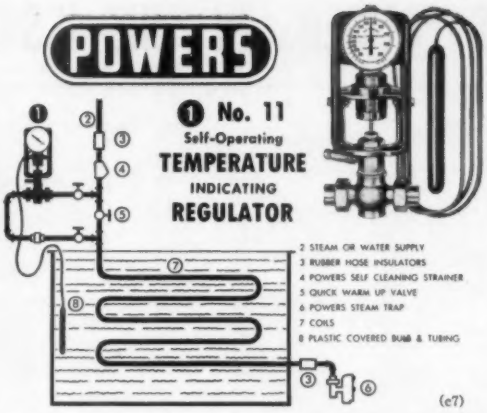

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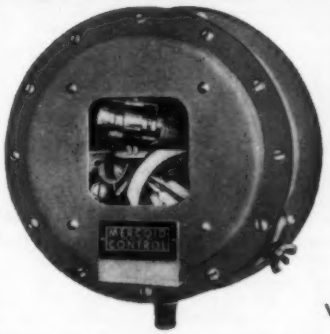

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KEPT ON THE MOVE

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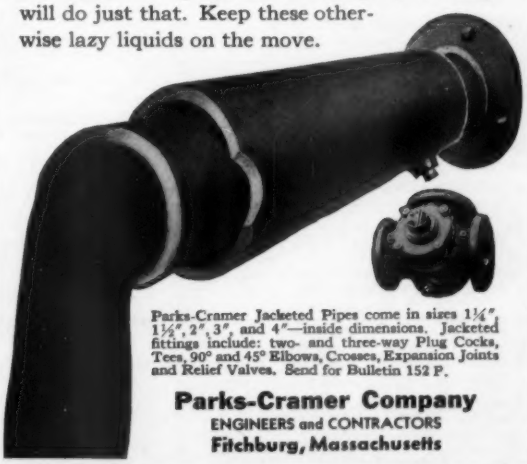

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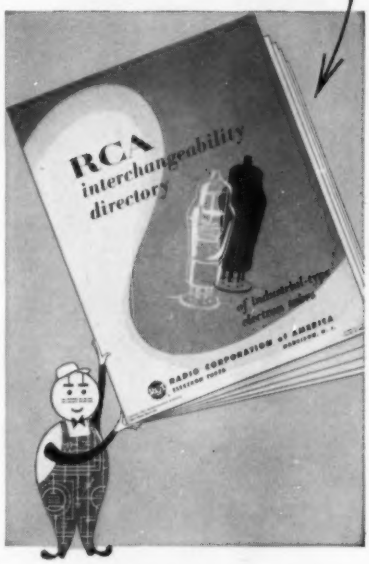

RCA INTERCHANGEABILITY DIRECTORY OF INDUSTRIAL-TYPE ELECTRON TUBES contains 16 pages of time-saving information for those who specify or purchase replacement tubes for industrial electronic equipment. Listing industrial tubes of 26 manufacturers and the equivalent RCA-type designations—approximately 2000 types in all—this DIRECTORY covers Vacuum Power Tubes, Vacuum and Gas Rectifiers, Thyratrons, Ignitrons, Magnetrons, Cold-Cathode (Glow-Discharge) Tubes, Phototubes, Oscillograph Tubes, Camera Tubes, and Receiving-Type Tubes for Industry and Communications.

Write on your company letterhead to RCA, Commercial Engineering, Section E34T, Harrison, N. J., for a copy of the new RCA INTERCHANGEABILITY DIRECTORY—Form No. ID-1020A.

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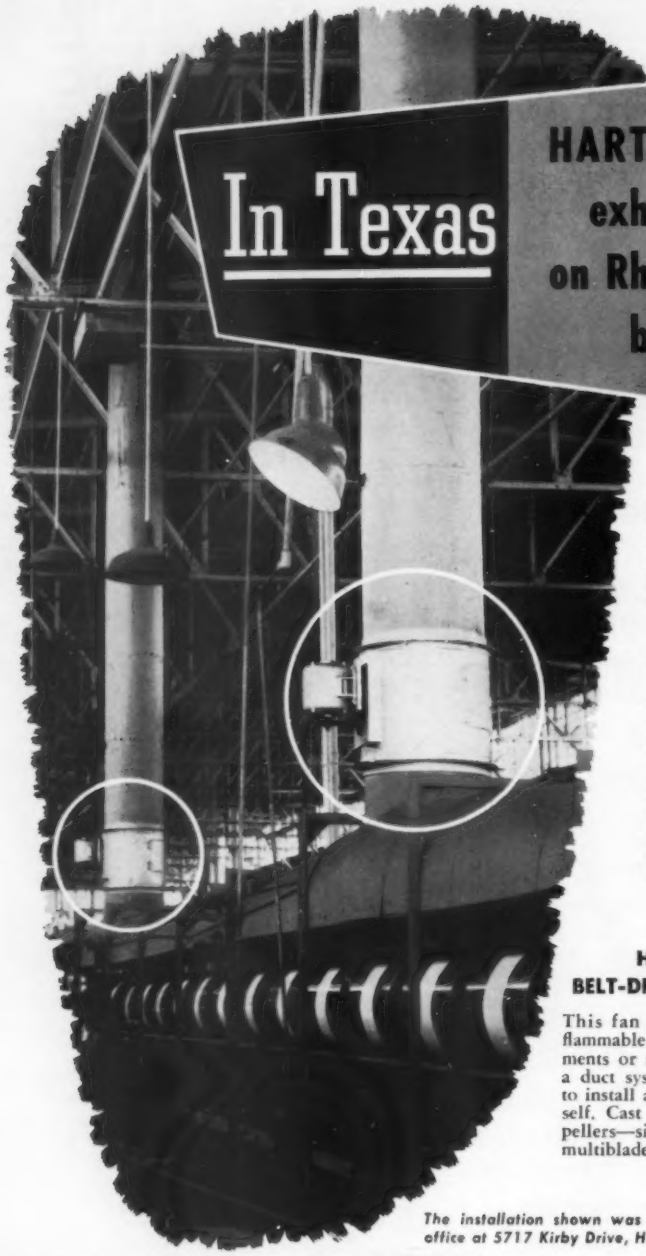


In Texas

HARTZELL DUCT FANS exhaust smoke and fumes on Rheem's high-speed barrel production line

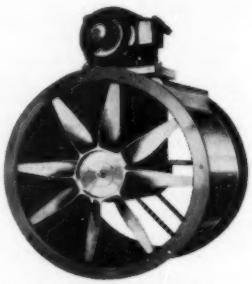
At the Rheem Manufacturing Company plant in Houston, Texas, two 24", 1 HP Hartzell belt-drive duct fans in a perforated head remove welding smoke and paint fumes along a high speed barrel production line. Other Hartzell fans power similar exhaust systems in every state in the Union.

Why should Rheem choose Hartzell? Because in thousands of tough industrial installations, Hartzell fans have proved their efficiency, rugged reliability and long life. And these are the characteristics wide-awake management demands of its air moving equipment.

If you have an air-moving problem of any kind, Hartzell fans . . . and Hartzell engineering "know-how" . . . can solve it for you. But don't wait until a problem arises . . . get acquainted now with what Hartzell can do for you. Just mail the coupon below or call your nearby Hartzell field engineer.

HARTZELL BELT-DRIVE DUCT FAN

This fan is ideal for moving flammable fumes, corrosive elements or abrasive dust through a duct system. And it's as easy to install as a section of duct itself. Cast aluminum alloy propellers—single, two-propeller or multiblade models—12" to 60".



The installation shown was handled by the Hartzell field office at 5717 Kirby Drive, Houston, Texas, phone KE-4565.

HARTZELL propeller fan co.

Div. of Castle Hills Corp.

Please send me a copy of Bulletin A-109A showing Hartzell duct fans and other Hartzell air moving equipment.

Name _____

Company _____

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If student, check here for special information ☐

201 Herrman Ave. Piqua, Ohio

PROPELLER-TYPE FANS • BLOWERS
ROOF VENTILATORS • UNIT HEATERS

ENGINEERING OFFICES IN PRINCIPAL CITIES

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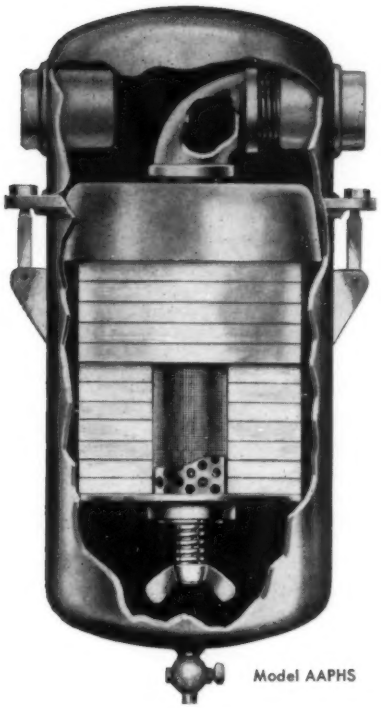
does the WEATHER get in your AIR LINES?

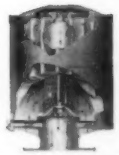
you need STAYNEW ABSORPTION FILTERS



Model AAPHS

At this time of year—when the humidity is high—your compressed air lines carry lots of water . . . water that can rust and clog your equipment, ruin your work, or shut down your boilers.

That's why you need Staynew Absorption Filters in your lines. They remove every last trace of oil and moisture. In thousands of installations throughout the country Staynew Absorption Filters are protecting equipment and preventing process interruption . . . in most cases they are positively essential.



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DOLLINGER DEL. PROTECTOMOTOR STAYNEW FILTERS

DOLLINGER CORPORATION

ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

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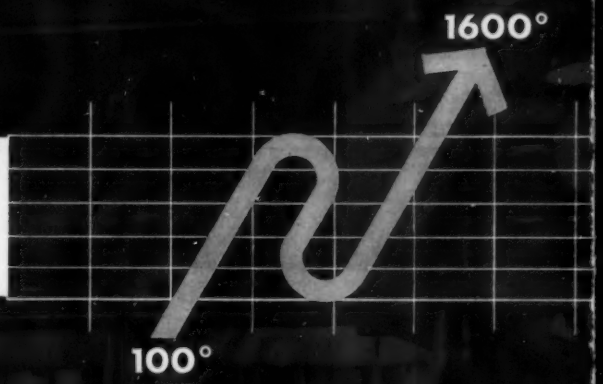

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Plant Engineering

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